NETWORK WORLD
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# SQL coalition tackles open access issue

By Susan Breidenbach
West Coast Bureau Chief

SAN FRANCISCO — User demands for standards and interoperability that started at the basic network hardware level have spiraled upward to complex relational data base management systems.

Are the demands unreasonable and vendor promises to satisfy them unmeetable?

Insisting otherwise, a group of relational DBMS vendors last fall formed the SQL Access Group with the ambitious goal of developing a standard method for front-end SQL applications on client workstations to access any of the group's SQL-based data base engines.

**ANALYSIS**

This would eliminate the need for developers of client applications to create different versions for each back-end data base they want to support, thus multiplying severalfold their potential customer base. On the user side, the standard is supposed to enable customers to mix and match front-end applications and back-end relational DBMSs.

The SQL Access Group completed its first specification this spring and is now building a pro-

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Dick Griffith, vice-president of the World Banking Group

# Back from the brink: Bank of America reaps net profit

Unshaken commitment to networking strategy helps bank rebound from $1 billion loss in 1986.

By Walter Sweet
West Coast Correspondent

SAN FRANCISCO — Bank of America National Trust & Savings Association's network strategy has been instrumental in helping the financial giant rebound from losing almost $1 billion four years ago to turning a $1 billion profit today.

Critical to the bank's revitalization was its decision to continue investing in technology, even when the going got toughest.

When the bank hit rock bottom in 1986 — the year it had to write off bad Third World loans — it spent about $400 million on automation technology. Its ongoing investment in technology has helped the company reduce telecommunications costs from $180 million per year in 1986 to $150 million today and cut its staff from 80,000 to 58,000 without a significant reduction in services.

For the World Banking Group, a division of Bank of America that does business with 450 of the Fortune 1,000 companies, new technology has cut costs by 38% while allowing the unit to take on 30% more business.

The retail side of the bank has used technology to attract more customers and — among other things — triple the number of

*(continued on page 44)*

# Changing user needs driving outsourcing

First article in *NW* series explores growing interest in outsourcing, confusion surrounding the issue.

By Wayne Eckerson
Senior Writer

OUTSOURCING
*First in a series*

Few management trends in recent years have generated as much interest as outsourcing or been so widely misunderstood.

Most network professionals say outsourcing is not a new phenomenon, but during the past year or so, many have rushed to evaluate outsourcing and its potential for their firms. Unfortunately, users, vendors and consultants often define the term differently and disagree about the potential benefits and risks involved in outsourcing.

Some managers see outsourcing as a way to contend with the shortage of skilled workers and free staff to develop strategic applications. Others are under pressure to rein in rising costs and reduce head count in order to survive business downturns, stiffening global competition or heavy debt burdens from leveraged buyouts or mergers.

According to The Yankee Group, a Boston-based market research firm, all Fortune 500 companies will evaluate outsourcing and 20% will sign outsourcing deals during the 1990s. The firm also predicts that the market for outsourcing services will climb from $29 billion today to $49.5 billion in 1994.

Companies have been farming out certain information systems (IS) and network functions for years to professional service firms such as Electronic Data Systems Corp. But the forces driving user interest in outsourcing today and the size and scope of recent outsourcing agreements represent a clear break from the past.

Many of the highly publicized outsourcing contracts to date, notably those of Eastman Kodak Co. and Merrill Lynch & Co., Inc.,

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# Motorola to build global cellular net

By Paul Desmond
Senior Editor

NEW YORK — Motorola, Inc. last week said it will build a $2.3 billion global voice and data cellular network supported by 77 low-orbit satellites.

The satellites used for Motorola's planned Iridium network will act as a digital switching system in space that supports communications to remote locations where cellular — or possibly even terrestrial — telephone service is not offered today. The net will be linked to public switched telephone networks and existing cellular nets.

Iridium could be a boon to trucking, maritime, oil and aviation companies, as well as other businesses that need to track cargo and keep in touch with employees in hard-to-reach locations, said John Knudsen, manager of user terminal development at Motorola.

"It sounds like an extremely interesting concept," said Nick

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## NETLINE

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**A EUROPEAN COMMISSION** pact could ease net equipment restrictions. Page 2.

**MCI SET TO SPEND** $2.4 billion on net upgrades. Page 2.

**NEW ENGLAND TELEPHONE** software bug overbills 80 customers by millions. Page 2.

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**SECOND-TIER CARRIERS** say AT&T deregulation, aggregators pose threat. Page 6.

NEWSPAPER

## FEATURE

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# Telemanagement tools keep nets under control

By Salvatore Salamone
Features Writer

TELECOM
BUYER'S GUIDE

With the latest crop of facilities management and telemanagement software, Dick Tracy's two-way wrist radio may be about the only device network administrators will have trouble managing. And that's only because no one's written an analog radio module for these packages.

The software that *is* available, however, presents administrators with an array of tools for controlling the costs, operations and planning of their networks.

Today, the software packages that offer the most features — and that can handle the volume of call traffic typical in an enterprise telecommunications system — run on mainframes or minicomputers. Many personal com-

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# EC members agree to ease equipment certification

## U.S. vendors need only to get authorization from single testing facility for European distribution.

**By Barton Crockett**
Senior Editor

LUXEMBOURG — A policy-setting arm of the European Commission last week forged an agreement that will make it easier for U.S. vendors to sell network equipment in Europe and for users to build networks spanning the continent.

The agreement, reached during a meeting of the European Commission's Council of Ministers here, commits members of the European Community to ease restrictions on the certification of equipment that interfaces with public networks. The agreement will enable vendors to get approval from a single authorized testing facility to market and install equipment throughout the 12 member nations of the European Community.

Currently, vendors must have equipment approved for use in each country they plan to sell it in. Eliminating this requirement is seen as vital to the creation of an integrated market by 1992. It should also ease the task of building pan-European networks.

Although the Council of Ministers' agreement is not yet binding, it is expected to be enacted as an official European Commission directive within four to six months. All 12 Common Market countries would then be required

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# MCI allots funds for net expansion, improvements

## Designates more than $2b for net upgrades.

**By Bob Wallace**
Senior Editor

WASHINGTON, D.C. — MCI Communications Corp. said at a press conference here last week that it will spend $1.2 billion this year and an additional $1.2 billion in 1991 to upgrade its net.

The money will be used for network expansion, a signaling system upgrade, installation of new T-3 digital access and cross-connect systems (DACS) and improvements to MCI's Digital Data Network. MCI spent $1 billion on capital expenditures in 1989.

Richard Leibhaber, executive vice-president and group executive for MCI, said the company is already upgrading its Common Channel Signaling System 7 (CCS7) network to handle increased traffic loads and to lay the foundation for the delivery of advanced services such as Integrated Services Digital Network.

"Last year, our network carried 7.5 billion billable calls, a jump of almost 40% over 1988," Liebhaber said. He said he anticipates network traffic to continue to grow rapidly.

The CCS7 upgrade will more than double the message handling capability of the out-of-band signaling network from 9,000 to 21,000 messages per

*(continued on page 8)*

# N.E. Tel pays out millions, rectifies billing blunder

**By Bob Wallace**
Senior Editor

BOSTON — New England Telephone and Telegraph Co. last week said it has corrected a problem in billing software used in a central office here that has cost 80 customers millions of dollars over the last several years.

The Commonwealth of Massachusetts discovered in March that it was being billed twice for each message unit and brought the problem to the attention of New England Telephone, which has since issued credits to the state and other affected customers.

The state estimated that the billing problem cost the state $6 million over the past five years.

With the assistance of the state, New England Telephone tracked the problem to billing software running on an adjunct processor in its Bowdoin Street central office, the spokesman said.

He declined to name the other customers affected by the billing problem.

"The billing software looks at the time the call was placed, where it was placed from and to whom, and the call length. [It then] translates that into a charge using a series of tables," the spokesman said. "The program billed one-message-unit calls as two-message-unit calls."

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# Briefs

**DEC maps out factory link.** Digital Equipment Corp. last week announced software that enables different vendors' factory equipment to communicate directly with VAX applications. The DECOmni/VMS software is based on the International Standards Organization's Manufacturing Message Specification (MMS), which defines a standard interface between computer-based applications and factory floor devices. Without DECOmni/VMS or other MMS-compatible software, users have to develop custom interfaces for each factory floor device. DECOmni/VMS will ship in September. Pricing starts at $530 per VAX.

**AT&T cuts international 800 rates.** AT&T last week filed a tariff that would reduce international 800 service rates by an average of $6 per hour. The carrier also reduced the average minimum amount of time users are billed for international 800 calls from one minute to 30 seconds. If approved, the tariff would take effect Aug. 12.

**RBHC buys into Argentinian carrier.** Argentina last week split its national carrier, Empresa Nacional de Telecomunicaciones, in half and sold off a 60% interest in each piece to two consortiums. A group lead by Bell Atlantic Corp. and Manufacturers Hanover Corp. paid $100 million in cash for Telco North, and Manufacturers Hanover agreed to forgive $2.31 billion in Argentine government debt and interest payments. Manufacturers Hanover supplied all the cash for the Telco North purchase, but Bell Atlantic will run the network for a 4.9% ownership stake and fees from the bank.

A consortium that includes Citicorp and the Spanish carrier Telefonica de Espana bought 60% of Telco South for $114 million in cash and $2.7 billion in government debt and interest payments.

**TCP/IP vote postponed.** An ANSI task group last week decided to postpone a decision on whether to standardize four TCP/IP protocols ("Std. push for TCP/IP miffs OSI backers," *NW*, June 18). Lyman Chapin, chairman of ANSI's X3S3.3 Task Group, said participants' roles had to be more clearly defined. To iron out the problems, the task group plans to meet next month with the Internet Engineering Task Force, which handles development work on TCP/IP standards.

**3Com posts financial results.** 3Com Corp. finished off its fiscal year ending May 31 with record sales for the year and the final quarter, but profits were down for both periods. Sales were up 9% from $385.9 million in fiscal 1989 to $419.1 million this year, but earnings tumbled 40%, down from $34.3 million in 1989 to $20.5 million this year. Fourth-quarter sales increased from $116.8 million in 1989 to $117.3 million this year, but net income of $7.3 million was down nearly $1 million, primarily because of a onetime write-off of $2.5 million to pay for 3Com's new headquarters.

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# Madge Networks recalls faulty token-ring adapters

By Laura DiDio
Senior Editor

SAN JOSE, Calif. — Madge Networks, Ltd. last week recalled 800 of its 4M/16M bit/sec token-ring adapters because of a design flaw that causes a high rate of data errors on local-area networks supporting more than 15 nodes.

Madge Networks, which only recently began shipping the dual-speed token-ring boards, said it will not ship any more of the adapters until the problem has been isolated and corrected. The 800 recalled adapters represent the total number of boards Madge Networks has shipped to date.

Madge Networks' adapter woes may make it more difficult for users to purchase 4M/16M bit/sec token-ring boards since the only other suppliers — IBM, Proteon, Inc. and Western Digital Corp. — are having trouble keeping pace with demand.

Madge Networks President Robert Madge said he ordered the recall following a complaint from a user experiencing an excessive number of data transmission errors on a 30-node token-ring LAN. Madge Networks tested the adapters and verified that they produced too many so-called "soft" errors when the net was operated at 16M bit/sec speeds.

The vendor said soft errors involve problems with delivering data across the token-ring LAN. By contrast, "hard" errors involve corrupted data and cause the network to drop packets.

"We haven't determined the cause of the problem, but we know it doesn't result in hard errors," Madge said. "Until we pinpoint and correct the problem, we won't ship any more 4M/16M bit/sec token-ring adapters."

Madge acknowledged that his company had not tested its adapters in networks with more than 15 nodes.

"We should have done that, and we have to bear the responsibility for not doing it and for not discovering the problem before the adapters went out the door," Madge said. He added that he made the problem known to Texas Instruments, Inc., the Dallas-based manufacturer of the semi-

*(continued on page 44)*

# Bypassers say Bell fiber nets unjust

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — Metropolitan Fiber Systems, Inc. (MFS) last week said the RBHCs will burden ratepayers with millions of dollars in expenses for new self-healing fiber-optic networks designed to serve only their largest customers.

In a letter to the Federal Communications Commission and regulators in six states, MFS claimed that the regional Bell holding companies are trying to push costs for their fiber networks onto smaller customers, even though large business customers will be the primary beneficiaries of the projects.

Royce Holland, president of MFS, an alternative provider of private-line services, claimed that the fiber nets are designed to shut out competitors.

"[The RBHCs] are building nets in the same locations, targeting the same clients with the same services," he said. "[They] are spending money like drunken sailors to fight competition."

Robert Atkinson, vice-president of regulatory and external affairs with Teleport Communications Group, an alternative local provider with networks in Boston and New York, said the RBHCs are squandering money to duplicate nets in existence.

Atkinson said users are not pushing for fiber facilities, but rather network diversity.

The RBHCs last week denied MFS' claims. "Investments made to modernize our network benefit

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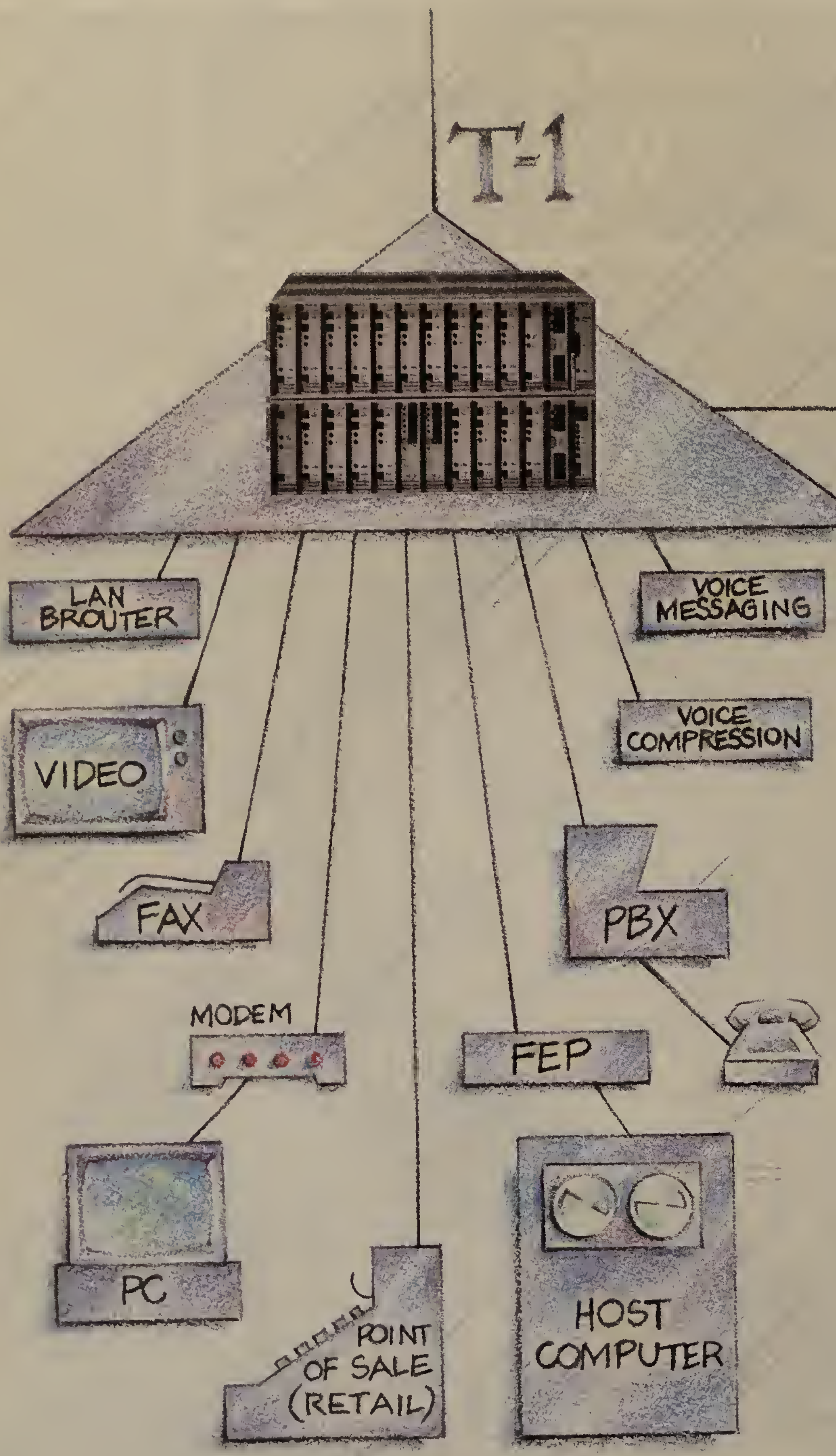

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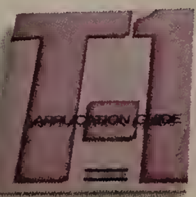

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# Apple to release portable DAL connectivity language

## Third-party vendors could use new version to add Data Access Language support to offerings.

**By Jim Brown**
Senior Editor

CUPERTINO, Calif. — Apple Computer, Inc. last week said it plans to offer a portable version of its Data Access Language (DAL) that would enable third-party vendors to add DAL support to data bases and operating systems not already backed by Apple.

DAL, previously called CL/1, is a connectivity language used to develop client/server software that allows applications running on Macintoshes to transparently extract data from various vendors' data base management systems running on mainframes or minicomputers.

Apple's intention to offer a portable DAL version indicates the company is counting on third parties to extend DAL to a broader range of operating systems and DMBSs, while Apple will continue to enhance versions of the software for IBM and Digital Equipment Corp. environments.

Apple thinks that the cost to internally develop and support additional DAL-based server software for other vendors' operating environments is too high, according to Lance Hoffman, DAL product manager.

Currently, Apple offers DAL-based server software that supports IBM's VM-based SQL/DS and MVS-based DB2, as well as DEC's VAX-based Rdb and VAX-based DBMSs offered by Informix Software, Inc., Ingres Corp., Oracle Corp. and Sybase, Inc.

The portable version will enable software developers to write server software that will let Macintoshes access Informix, Ingres, Oracle and Sybase data bases running in different environments, such as Unix. Additionally, third parties can offer DAL-based software to connect to other DBMSs.

Server software developed with the portable DAL version will work in conjunction with existing DAL-based client applications.

DAL-based client software formats data requests generated by a Macintosh application into standard ANSI SQL requests and routes them to DAL-based server software. The server-based DAL component converts the SQL request to support the SQL format on the server's DBMS, which then processes it and returns the data to the Macintosh.

Hoffman said Hewlett-Packard Co. and Novell, Inc. have already expressed interest in acquiring a portable version of DAL. He hinted that Novell wants to build DAL-based server software supporting access to DBMSs running under NetWare, while HP wants to build DAL-based server software for use on its Unix-based systems.

According to Hoffman, Apple still needs to "better document how DAL works and provide a set of tools so third parties can verify that they did the port right." He said Apple hopes the documentation, test tools and licensing fee structure for the portable version of DAL will be ready by year end.

Apple will also count on third parties to provide end users with support for the DAL-based server software they develop, Hoffman said. This means Apple expects customers buying DAL-based server software to turn to third parties for support. Apple will lend technical support to third parties only when they cannot resolve a problem. Off-loading support tasks to third-party vendors will keep Apple's small DAL support center from becoming overburdened, Hoffman said.

Analysts said they were not surprised by Apple's intention to rely on third parties to further expand the number of DAL-based server software on the market.

"The approach Apple wants to take doesn't surprise me," said Richard Finkelstein, president of Performance Computing, Inc., a Chicago-based data base consultancy. Developing data base access software is a difficult and intricate technical task that forces Apple to understand other vendors' operating systems, he said.

"It's a fairly expensive undertaking for them to do all that work, and this is the kind of business I'm sure Apple would rather not be in," Finkelstein said.

"The reason this stuff is so expensive to support is because these types of products are generally very complex and often very buggy," he said.

# Changing long-haul mart threatens all but Big 3

## Small carriers face future of tough competition.

**By Bob Brown**
Senior Editor

SAN FRANCISCO — Second-tier long-distance carriers said last week that they are fighting an uphill battle for survival and that users could suffer if they lose.

Attendees at the Comptel 90 Summer Business Conference here said a Federal Communications Commission proposal to ease regulation of AT&T in addition to the growing power of long-haul service aggregators pose serious threats to competition in the industry.

The conference was sponsored by the Competitive Telecommunications Association (Comptel), a trade group representing several hundred long-distance carriers, excluding the Big Three — AT&T, MCI Communications Corp. and US Sprint Communications Co.

Carrier executives said the proposed FCC rulemaking on AT&T, on which comments are due this week, could give AT&T the pricing flexibility needed to wipe out smaller carriers. That would hurt users because competition among the hundreds of long-distance carriers across the nation has resulted in lower prices and service innovations, Comptel members said.

"It is Comptel's view that deregulation of AT&T, at this time when competition has taken root but is still fragile, would be tremendously premature and would leave AT&T holding all of the advantages," said James Smith, Comptel's president.

Roy Wilkens, president of Williams Telecommunications Group, Inc., a Tulsa, Okla.-based private-line provider, said he is encouraging Comptel members to file comments and evidence with the FCC to show that AT&T is still a dominant carrier.

But Wilkens said Comptel members are facing an uphill battle. "In my discussions with Al Sikes and Dennis Patrick, and with a lot of legislators, I don't believe any of them feel [Comptel members] are that important for the telecommunications growth of the U.S.," he said.

Regulators are, in effect, supporting the notion of an oligopoly consisting of AT&T, MCI and US Sprint, he said.

If that happens, Wilkens said, a future Comptel meeting would probably be held in a room "at the Holiday Inn in Tyler, Texas," instead of at San Francisco's luxurious Fairmont Hotel, where this year's conference was held.

"The writing is on the wall," said an executive at a regional long-distance carrier in the Northwest who requested anonymity. "The regulators overlook the importance of the regional service that Comptel members provide and are distinguished by. Because of this approach by the regulators, I'd wager that [the company of every person] in this room is either looking to make an acquisition or is looking to merge or be acquired as a way to survive in the

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# EC to ease certification

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to comply with it, possibly by as early as January 1991.

"This is indeed a very significant directive," said Alan Horne, managing director of the Chepstow, England-based consultancy Interconnect Communications Consultants, Ltd. "The impact for users will be that their manufacturers will be able to obtain approvals more easily, which will make it easier for them to use their preferred equipment."

Interconnect Communications Consultants helps manufacturers obtain approval to market and install communications equipment in Europe.

### Previous efforts

The only European Commission directive touching on certification of network equipment today requires member countries to approve the use of network equipment conforming to so-called Normis Europeenne Telecommunications standards.

But to date, only two of the standards have been finalized and only a handful of network equipment conforms to them. In addition, the equipment that does comply with the standards must be recertified in each Common Market country, a process that can take several months.

By contrast, the new European Commission agreement will enable manufacturers to take network equipment to any authorized testing center in the European Community. These testing laboratories will be able to certify equipment for compliance with either Normis Europeenne Telecommunications standards or country-specific standards for all 12 Common Market countries.

"I believe this is a vital decision for the European terminal equipment market," said Herbert Ungerer, a division head with the European Commission's directorate for competition, telecommunications and information technology.

The Council of Ministers' agreement dovetails with the European Commission's goal of having public networks in Europe offer services based on common standards. Currently, services are based on widely different standards, in part because each Common Market carrier uses different technologies.

But Horne said that the 12 Common Market carriers have committed themselves to deploying new services, such as Integrated Services Digital Network offerings, according to common standards. He said that this is being done through the auspices of the European Telecommunications Standards Institute, which is developing pan-European network standards that all Common Market carriers have pledged to support.

# Bypassers say Bell nets unjust

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all customers, not just large business customers," said a spokesman from Nynex Corp.

A spokeswoman for Pacific Telesis Group said that while fiber networks support special services geared toward large users, they are also used to carry switched traffic.

The self-healing fiber networks proposed by the carriers would, for the most part, be constructed in a double-ring configuration and will offer special redundancy and restoration features, as well as virtually error-free transmission.

Since April, five of the RBHCs — Ameritech, Nynex, Pacific Telesis, Southwestern Bell Corp. and US West, Inc. — have announced that they will build either single- or double-ring fiber networks in at least 26 cities by 1991.

US West announced in May that it will spend $35 million to build self-healing fiber loops in five cities; Ameritech said it will spend $100 million for facilities in seven cities. Pacific Bell has not released exact figures, but the cost to install double-ring fiber networks in seven areas is expected to range between $50 million and $100 million. Nynex and Southwestern Bell declined to release investment figures.

MFS' Holland claims that these expenditures are siphoning off money that was designated for more general network upgrades such as the replacement of party lines and switches.

Alternative carriers, however, are not the only critics of the fiber network plans. Massachusetts Attorney General James Shannon earlier this year blasted New England Telephone and Telegraph Co., saying the carrier was letting service deteriorate in Roxbury, a poor section of Boston, while it diverted resources to install fiber loops in the business district.

"In its attempt to improve its competitive position and bolster its profits, [New England Telephone] has placed the interest of a small number of businesses over that of an entire community," Shannon stated in a brief filed with the Massachusetts Department of Public Utilities.

Holland said the RBHCs intend to use revenue from general ratepayers to artificially lower the cost of services on the fiber networks. He said US West charges $475.80 per month for a high-capacity circuit with automatic backup, but customers on the fiber net will pay $227.60 for the same service, which includes an extra route to the carrier wire center. Based on tariffs of available services, the charges on the self-healing net should be about $747.81 per month, he said.

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## MCI allots funds for net expansion

*continued from page 2*

second, Liebhaber said. MCI completed implementing CCS7 throughout its 46,300-route-mile domestic net in April 1989.

The carrier is making hardware enhancements to its signal transfer points, as well as loading new software into them. MCI expects to complete the upgrade by the first quarter of 1991. The new signal transfer points software will support a capability that will help MCI link its CCS7 net to other carriers' CCS7 signaling nets.

The MCI net, which is roughly 70% digital and 30% analog, represents an investment to date of $7 billion. Although the net has expanded in terms of total route miles, the number of switches has fallen from 121 in 1986 to 91 today, as MCI has replaced analog switches with high-capacity digital switches.

MCI's investment plans pale compared with those of AT&T, which said last year that it expects to spend between $2.5 billion and $3 billion in both 1990 and 1991 to increase the intelligence and capacity of its worldwide net ("Carriers bare plans to increase net IQ," *NW,* July 10, 1989).

MCI declined to elaborate on capital spending, but analysts said the carrier will use the bulk of the money to replace analog transmission facilities and add more international links.

Daniel Briere, president of TeleChoice, Inc., a Manchester, Conn., consultancy, said MCI will spend much of this money replacing 16,000 route miles of analog microwave with digital transmission facilities and buying capacity on undersea fiber-optic cables. "MCI has, by far, the largest amount of analog transmission facilities of the top three carriers," he said. "And with 17,000 fiber route miles, they have the least amount of fiber in the ground."

Liebhaber said MCI will demonstrate switched T-1 and T-3 services by year end. The company will spend $125 million on the project in 1990 and $300 million more in 1991, he said.

Although the CCS7 upgrade and network expansion pave the way for deployment of advanced services, MCI has not kept to its original ISDN timetable.

In May 1989, MCI said it would roll out true ISDN services in the first quarter of 1990. The carrier now says it will not introduce ISDN services until mid-1991. Rivals AT&T and US Sprint Communications Co. have already set pricing for Primary Rate Interface offerings. MCI has, however, made good on its promise to offer what it calls ISDN-like services. The carrier sells three such offerings: Digital Reconfiguration Service, MCI 800 Enhanced Services Package and MCI Two-Way Access.

The company last week also promised to boost the number of Data Access Points (DAP) from three to five by year end. DAPs are used to translate 800 numbers into user telephone numbers. ◘

## MCI to roll out voice features

WASHINGTON, D.C. — MCI Communications Corp. last week detailed at a press briefing here plans to announce within 60 days a set of network-based voice processing features.

MCI's planned offerings, which are expected to be rolled out under the name of Enhanced Voice Services (EVS), will enable customers to create custom voice processing applications on systems within the carrier's net.

Lawrence Bauman, senior vice-president of program management and systems planning for MCI, said users can save money by building applications into the network, instead of supporting them on customer premises equipment.

MCI customers will be able to use EVSs to build applications that allow callers to do such things as locate company dealers, enter orders or check on the status of their accounts, he said.

In a dealer locator application, the MCI network would route calls for a company's 800 number to an EVS platform. Callers would be greeted by a voice response unit using synthesized speech prompting them, for example, to press 1 to hear a list of dealers in New York, 2 for dealers in New Jersey and 3 for dealers in Connecticut.

The voice response unit would access the necessary information from its own data base or from a host on the customer's premises, and use speech synthesis to read back the requested information.

MCI already offers an EVS-like system for the private use of the Social Security Administration (SSA). The SSA's Message Routing System (MRS) routes calls to agents at 37 SSA telephone service centers across the country, according to Bauman.

With MRS, incoming 800 calls are routed to voice response units within MCI that greet the caller and, through a series of prompts, determine what agent group should receive the call.

MCI said it is considering setting pricing for the features based on customers' calling volume and the features used in their applications.

Requesting anonymity, a telecommunications manager for a major U.S. automaker that uses MCI as the primary carrier said network-based voice processing features will grow in popularity as users look to cut communications costs by reducing staff and limiting capital expenditures.

— *Bob Wallace*

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# INDUSTRY UPDATE

VENDOR STRATEGIES, MARKET TRENDS AND FINANCIALS

## Worth Noting

> "The European market is virtually closed to U.S. telecommunications products, and the situation is not likely to improve with the 1992 economic integration of the European community."
>
> **Edwin Spievack**
> President
> North American Telecommunications Association
> Washington, D.C.

## People & Positions

**Banyan Systems, Inc.** last week named **James D'Arezzo** vice-president of marketing at the Westborough, Mass.-based local-area network hardware and software vendor.

D'Arezzo is the fourth executive to hold the post since the fall. His responsibilities will include product and application marketing, distribution strategy, strategic marketing, telemarketing, market research, advertising, public relations and trade shows.

Most recently, D'Arezzo was vice-president of marketing, Europe and International, at Compaq Computer Corp.

D'Arezzo will report to **James Allchin,** vice-president and chief technical officer at Banyan. Allchin has been acting vice-president of marketing since **Jack Kay** departed earlier this year.

**Hughes LAN Systems** recently announced that **George Klaus,** the company's president and chief executive officer, is leaving to pursue other interests.

For the past four years, Klaus has been president of the Mountain View, Calif.-based local-area network equipment vendor. The company is seeking a candidate from outside the company to assume that role. A spokesman said an announcement should be made soon. ■

# Apple's Nauman discusses network challenges ahead

### Company needs to let Mac support FDDI, ISDN.

**Q&A** John Nauman, Apple Computer, Inc.'s director of networking and communications, recently shared his thoughts on Apple's network strategy with *Network World* Senior Editor Bob Brown. Nauman's responsibilities at Apple include overseeing development, engineering and quality assurance for all of the company's communications and networking products, except for modems.

**What do you see as Apple's major challenges in networking?**

We have to improve the visibility that Apple actually has networking. I think we've done a lot of the groundwork. We now have the capability to offer networks and internetworks and connect up to things.

One of the major thrusts for us is making the network less visible to people than it is right now. One of the things you do [in a Macintosh] when you want to attach to a server is you go through something called the chooser, which is a pretty good interface but was designed for relatively small networks.

As we start to look at larger networks, where you've got tens or hundreds of network devices, you wind up with thousands or tens of thousands of things we need to extract. That interface had better make it easy for the users to get at the devices or applications they want.

We also need to be ready for the much higher speed networking capabilities that are coming, like FDDI, and we need to be much more ready for ubiquitous networking things like ISDN.

We would also like to have the Macintosh be a premier platform in a number of areas such as multimedia that require much higher bandwidths.

The other thing we need to focus on is to continue to track companies like IBM and DEC and make sure we fit in well with the kinds of things they do.

**What is Apple's network server strategy?**

Our goal in life is not to build servers; it's not to build routers, either. There are companies out there like 3Com [Corp.] that build those machines. We do provide an AppleShare server that runs on a Macintosh. When you get up

*(continued on page 10)*

## INDUSTRY BRIEFS

Financially ailing **Western Union Corp.** last week confirmed that it is involved in discussions with possible buyers for the sale of its Business Services Unit, which includes the Easylink electronic mail service. The company's telex and priority services, such as Mailgram and Priority Letter, are also part of the Business Services Unit.

A Western Union spokesman said a portion of the proceeds from the sale of the Business Services Unit will be used to redeem some of the company's $530 million in outstanding debt. Western Union told the Securities and Exchange Commission it proposes to give its current noteholders new notes in order to successfully restructure the debt and reduce interest payments.

**Ungermann-Bass, Inc.** and **GTE Corp.** recently signed a two-year, multimillion-dollar agreement under which GTE Telephone Operations will sell Ungermann-Bass' full line of Access/One intelligent wiring hubs. The Access/One products serve as hubs for data networking equipment and support plug-in modules for devices such as asynchronous and IBM 3270 terminals, as well as Apple Computer, Inc. Macintoshes.

Atlanta-based **Contel Corp.** last week said it plans to sell off its Contel Office Communications unit, which provides shared telecommunications services to more than 1,100 customers in 14 metropolitan areas. Donald Weber, Contel president and chief executive officer, said the business did not fit with the company's core sectors, nor would it have a meaningful impact on the company's financial results. Contel said it has not found a buyer for the unit. ■

### Apple networking history

| | |
|---|---|
| 1984 | First Macintoshes shipped have LocalTalk LAN capabilities built in. |
| 1986 | Introduction of Macintosh-to-host connectivity. |
| 1987 | Unveiling of AppleShare, which enables a Macintosh to be configured as a file server. |
| 1988 | Apple forms alliance with Digital Equipment Corp. to develop products for linking Macintoshes into DEC environments. |
| 1989 | Seventeen new networking products introduced, including TokenTalk and EtherTalk offerings. |
| 1990 | DEC's LanWorks for Mac debuts, the first fruit from the DEC/Apple alliance. |

GRAPHIC BY SUSAN SLATER

SOURCE: APPLE COMPUTER, INC., CUPERTINO, CALIF.

# Apple casts Mac in client/server role

### Company positions Mac as client workstation to servers in IBM, DEC, TCP/IP and OSI networks.

By Bob Brown
Senior Editor

CUPERTINO, Calif. — By forging close ties between users' existing networks and its Macintosh, Apple Computer, Inc. has positioned itself to play a leading role in the emerging client/server market.

Long chastised by users for not paying enough attention to their networking needs, Apple has done an about-face over the past year and taken a number of steps to shore up the Macintosh's ability to connect into popular corporate networks.

Apple executives concede that they never intend to offer a local-area network that would rival those of IBM, Digital Equipment Corp. or LAN market leader Novell, Inc. Apple markets a 230K bit/sec LocalTalk network.

Instead, the company said it will leave the market for network operating systems and servers to other companies and focus on making its Macintosh the premier client workstation for user networks.

"The operating system requirements of being a great server vendor and a great client vendor are very different," said Doug McLean, Apple's product market manager for network integration products. The Macintosh's user friendliness makes it "the ideal client," he said.

Apple said it hopes to position the Macintosh as a client workstation to any type of back-end server, such as a LAN file server running a popular network operating system or a minicomputer or mainframe acting as a server. In that client/server environment, the Macintosh would request data from a server across the LAN.

Key to Apple's success in making the Macintosh a suitable client workstation is the range of networks the Macintosh can support. McLean said Apple has identified four key environments for the Macintosh: IBM Systems Network Architecture, DEC's DECnet, as well as Transmission Control Protocol/Internet Protocol- and Open Systems Interconnection-based networks.

"In order to become the best client in the world, Apple has to make it possible for Mac users to connect to whatever else is out there," said Doug Cayne, vice-president and director of personal computing at Gartner Group, Inc., a Stamford, Conn.-based market research firm.

> The Macintosh's user friendliness makes it "the ideal client," Apple's McLean said.
>
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But the client/server market has yet to mature, and demand for client workstations is still relatively low.

Until the technology catches on, Apple will outfit the Macintosh with terminal-emulation capabilities so it can access data residing on corporate mainframes, minicomputers and other hosts on existing nets.

Of the steps Apple has taken to bolster Macintosh ties to popular networks, its AppleTalk Licensing Program announcement two weeks ago is perhaps the most

*(continued on page 10)*

# MCI Vision fuels carrier battle for midsize market

## Service puts MCI in fray with AT&T, regional telcos.

**By Ellen Messmer**
Washington Correspondent

WASHINGTON, D.C. — MCI Communications Corp.'s recent announcement of MCI Vision, a service with a flat-rate pricing structure and advanced service options, is expected to intensify carrier competition for small and midsize customers that spend up to $50,000 per month.

According to industry analysts, MCI Vision will compete mainly with services offered by AT&T and regional carriers, which currently dominate this segment of the market. MCI estimates the value of the market at $18 billion.

Carole Craven, a senior analyst with Northern Business Information/Datapro, a research firm in New York, said there are about 10 million domestic businesses that spend up to $50,000 per month on telecommunications services, with the median expenditure being $25,000.

Under MCI Vision, which includes 1+ and credit card calls, the flat rate for peak business hours is 15 cents per minute when placed over dedicated access facilities and 20 cents per minute when switched access is used. International calls under MCI Vision also carry a flat rate but are tariffed on a per-country basis. MCI offers volume discounts based on usage from multiple company sites and 20% off the flat rates for off-peak hours.

According to Craven, the market that MCI has targeted with MCI Vision is split primarily among AT&T and smaller regional carriers such as Advanced Telecommunications Corp. (ATC), ALC Communications, Metromedia/ITT Long Distance and Telecom*USA, Inc.

The regional carriers have long been innovative in providing services to the midsize customer and may be able to fend off MCI with their own service packages, she said. Craven noted that local businesses often favor regional carriers because of community feeling and personal service.

But Robert Self, president of Market Dynamics, a New York consultancy, said MCI Vision may hurt the regional carriers more than AT&T because AT&T can endure market losses better.

Self also noted that one of the advantages of the MCI Vision plan is that it allows customers to combine calling from multiple locations into one volume discount plan. "The smaller carrier that doesn't serve those locations is at a disadvantage," he said.

> Craven predicted that AT&T and US Sprint will follow MCI's lead by announcing offerings.
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According to Craven, MCI Vision signaled "an evolution of the marketplace." She noted that while competition in this market to date has focused on pricing, from now on it will center on service options and functionality.

She predicted that AT&T and US Sprint Communications Co. will follow MCI's lead by announcing similar offerings.

Some of the regional long-distance carriers said they are already offering billing and call control packages, and are ready to take on MCI.

According to Greg Jones, vice-president of marketing for long-distance carrier Allnet Communications Services, Inc., a subsidiary of ALC, MCI Vision is nothing new.

"For the past year and a half, Allnet has been providing a growing arsenal of services to this very marketplace," Jones said. Allnet offers 15 different accounting code packages, executive summary profile reporting, a travel card and call control.

Like MCI, Allnet has also targeted the midsize market.

Jones said he believes that MCI's advertising of the services available in MCI Vision may benefit companies such as Allnet that offer similar deals. He said national advertising will inform users about what is available, and they will come to expect these features. Allnet will then be able to sell to an informed customer.

George Grabowich, product line manager for Metromedia/ITT, echoed Jones' assertions. He said MCI's mass media MCI Vision advertising campaign is "actually beneficial in some ways: It will open the eyes of the customer base."

Grabowich said Metromedia/ITT will unveil in early July a new product called Precision, which will be available in 22 states. Like MCI Vision, it will offer customized billing arrangements and pricing that is not distance-sensitive, though it lacks MCI Vision's call control features.

Before its merger in 1988 with ITT Corp., Metromedia, Inc. offered an earlier version of Precision in four states. That experience has led Metromedia/ITT to refine the product, according to company executives.

Chrysa Golashesky, Metromedia/ITT's director of marketing, noted that Precision will include a discount option for cities displaying heavy call traffic.

"We've tried to make Precision fit the profile of the state," she said, adding that customers want to see reduced rates for localities they call often.

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# Apple casts Mac as client/server

*continued from page 9*

important, analysts said.

Under the program, Apple will sell its AppleTalk Phase 2 protocols directly to third-party software and hardware developers to make it easier for them to tie Macintoshes into their LAN and wide-area network environments, McLean said.

Previously, developers were faced with the arduous task of writing AppleTalk software from scratch.

Darrell Miller, Novell's executive vice-president for marketing and services, said the licensing program has already "accelerated the development of our system software products and assured our Macintosh users of complete AppleTalk compatibility now and in succeeding revisions."

While observers praised Apple's strategy of "driving multivendor solutions" by working with other vendors to tie the Macintosh into heterogeneous networks, they also questioned the company's reliance on third-party vendors to deliver so many pieces of the Apple client/server plan.

"There absolutely are risks in relying so much on other vendors," said Jack Karp, a vice-president at META Group, a Westport, Conn., market research firm. "There's always the chance of third-party vendors reducing their support for Apple."

To its credit, Apple last June rolled out 17 new networking products, including token-ring and coaxial/twinaxial cards that strengthened Apple's connection to the IBM world.

Apple also introduced interfaces enabling better Macintosh-to-TCP/IP, Macintosh-to-Ethernet and Macintosh-to-OSI (X.25) connectivity, all of which fit with Apple's strategy for becoming a ubiquitous client workstation supplier.

Earlier this year, a previously announced technology alliance with DEC resulted in DEC's announcement of LanWorks for Macintosh software, a collection of third-party vendor-developed products licensed and bundled by DEC and designed to improve Macintosh-to-VAX connectivity.

Later this year, Apple will again boost the connectivity options available to Macintosh users when it rolls out its new System 7.0 operating system, which originally was expected to be available by now, said John Nauman, Apple's director of networking and communications.

System 7.0 will include a communications function that will enable applications on separate Macintoshes to talk to one another and provide peer-to-peer file sharing for work group-type applications without the need for a server-based network operating system, he said.

> "There's always the chance of third-party vendors reducing their support for Apple."
>
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### Addressing user concerns

Apple is also trying to resolve some issues users have with the company's network strategy.

For example, Mike Garrison, vice-president of information systems services at Allergan, Inc. in Irvine, Calif., which has 600 networked Macintoshes, said the company's LocalTalk networks tend "to get bogged down [because of their slow speed] if we push them too hard."

Apple is addressing user concerns about a lack of high-speed network products by beefing up its research and development efforts to link Macintosh computers into Fiber Distributed Data Interface LANs, Nauman said.

Existing products enable Macintoshes to connect to Ethernets and 4M bit/sec token-ring nets, he said.

Rick Christjansen, manager of automation support at Manville Sales Corp.'s Manville Technical Center in Denver, pointed out the difficulty in tracking down the cause of AppleShare file server crashes.

"There needs to be significant work done with administrative tools within the AppleShare environment," he said.

According to Nauman, Apple is working on that problem. The bulk of Apple's network management efforts are going toward supporting the integrated net management systems of IBM and DEC, as well as the Simple Network Management Protocol, he added.

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# Nauman outlines net challenges

*continued from page 9*

to a machine in the class of a Macintosh IIFX, you're talking about a pretty high-powered machine.

**Is it a liability for Apple to be relying so much on other vendors to supply products for its network strategy?**

There are two reasons why I don't think it's a problem. The first is that those guys are already there. So we had better have a strategy that allows us to coexist with them.

The second reason is that we at Apple don't provide systems or systems integration. We provide personal computers. The emphasis there is on personal.

Given that type of a business orientation, we have to match up with what people do if they want to talk to other types of machines.

**Macintosh users point out an acute need for network management software for Macintosh networks. What are you doing to address this?**

We provide one level of capability called Interpoll that allows you to go out and monitor the network at a very low level, and understand what specific stations are doing and what packets are whistling across the network.

We think it is also important to have something that allows people to manage their AppleTalk networks at a higher level than that.

We are working to let them do that.

Going back to where Apple fits into the corporate customer's world, we think that anything we do in network management has to fit into the broader picture of the other networks that the customer has.

Apple's John Nauman

**Some observers say it is becoming difficult for Apple to use its graphical user interface as a means to differentiate the Macintosh from other microcomputers now that Microsoft Corp.'s Microsoft Windows 3.0 has been unveiled. Will Apple emphasize networking in light of this?**

I don't think we're going to base how people view Apple and the Macintosh on networking capabilities. I think we're going to continue to be out in front on the user interface and ease-of-use things for a long time. The intent really is to keep the focus on having the best personal computer people can buy and, as a footnote, that we're going to provide the networking that people need.

# TELECOMMUNICATIONS

**CARRIER SERVICES, CENTREX, CPE, WIRING SYSTEMS AND BYPASS**

## Worth Noting

AT&T recently filed suit in an Atlanta district court seeking $4 million in damages from Hill Grading and Septic Tank Co., the Carrollton, Ga., independent contractor that cut an AT&T fiber in Villa Rica, Ga., on May 18. The Atlanta-to-Birmingham, Ala., fiber route, which carried 163 T-3 lines, was down for more than five hours.

## Carrier Watch

**AT&T** last week said it will provide voice and data network services and Definity private branch exchanges to Sentry Life Insurance Co. of Stevens Point, Wis., under separate contracts totaling more than $20 million.

The insurance firm expects to cut communications costs by about one-third through consolidating multiple networks and using AT&T's Multi-Location Calling and Revenue Volume Pricing Plans.

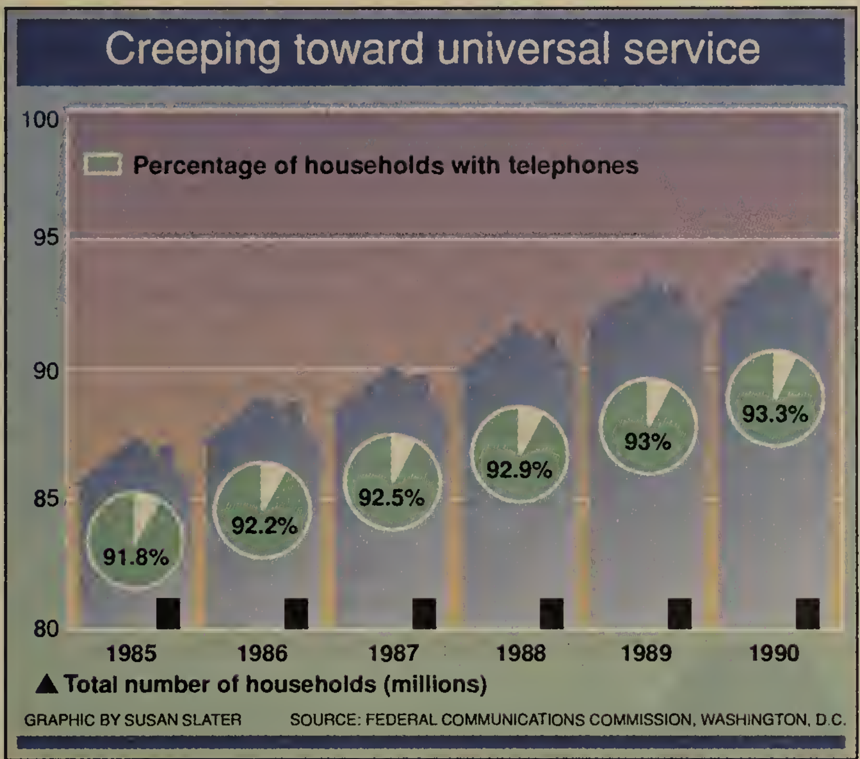
Sentry will use AT&T's Software-Defined Network to link its Stevens Point corporate headquarters with 50 regional offices across the nation. The company will use AT&T's Dataphone Digital Service to tie these same sites into a nationwide backbone.

Sentry customers will use AT&T's Megacom 800 and 800 Readyline services to reach the firm's offices.

The $1.1 billion firm chose AT&T as its nationwide PBX supplier, initially agreeing to buy three Definity switches and one Audix voice mail system for its headquarters, as well as 11 System 75 PBXs for its regional offices.

Sentry will enroll 50 of its offices in AT&T's Multi-Location Calling and Revenue Volume Pricing Plans, and will use the carrier's Execu-Bill Service to manage corporate credit card billing. ◼

Creeping toward universal service



GRAPHIC BY SUSAN SLATER SOURCE: FEDERAL COMMUNICATIONS COMMISSION, WASHINGTON, D.C.

# Financial services company picks MCI for Vnet, 800

Household Int'l sticks with its primary carrier.

**By Anita Taff**
Washington Bureau Chief

PROSPECT HEIGHTS, Ill. — Household International, Inc., a $1.5 billion financial services company based here, recently signed a three-year, multimillion-dollar contract with MCI Communications Corp. for Vnet and 800 services.

MCI has been handling about 65% of the firm's long-distance traffic for the past three years but will now upgrade Household International's Prism Plus dial-1 service to a Vnet and 800 service.

Household International's net supports collections and customer service applications, as well as internal communications for six major business divisions at about 1,000 locations in 40 states.

Late last year, Household International began looking for ways to cut network costs while adding features such as a uniform dialing plan, said Howard Tyska, vice-president of information services at the company. He said Household International decided that a virtual net would be the best vehicle to meet its needs. Tyska put out a bid, to which AT&T, MCI and US Sprint Communications Co. responded.

MCI bid a Vnet network with the majority of locations tied in via switched access. The carrier will also provide its Advanced 800 service, which enables Household International to route traffic destined for any 800 operations center to any other during emergencies or peak load times.

Household International will also utilize MCI's Configuration Manager (formerly called Customer Information Manager), which lets the user access MCI data bases via a personal computer to order traffic rerouting and network configuration changes.

The company will use MCI's Portfolio Billing service, which provides a consolidated bill for multiple services at multiple locations. The firm's telecommunications staff will receive one summary bill, but each location will be billed and pay for communications services separately.

According to Tyska, "The reason MCI was selected was that they were the incumbent in the bid and we were satisfied with their service. They came up with a competitive offer, so there was really nothing to [persuade] us to leave MCI."

> "Reliability is No. 1 on our list," Household International's Tyska said.
>
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"The uniform dialing plan was something we wanted," he added. "The other bells and whistles that come with being on a virtual network were pluses. But if they weren't there, it wouldn't have stopped us from moving to a virtual network arrangement."

Tyska said the overriding concern in choosing a network provider for Household International was reliability. "Reliability is No. 1 on our list," he said. "Price is always a concern, but in this

*(continued on page 12)*

# Users urged to look at more custom bids

Speakers at ICA seminar say most users still take the first custom bid offered, limiting their options.

**By Bob Wallace**
Senior Editor

BOULDER, Colo. — Users and analysts at the recent International Communications Association Network Design Seminar here discussed methods of soliciting custom network deals and ways to manage the nets.

Speakers said users should solicit custom network proposals from multiple carriers to maximize competition and include stipulations in the final contract that enable them to rework the deal to meet changing needs.

Gus Bender, a second vice-president with Hartford, Conn.-based The Travelers Corp.'s telecommunications division, said most users are still biting at the first custom deal they are offered instead of requesting multiple bids.

Users should, at the least, solicit custom deals from their primary and secondary carriers.

"Working with multiple carriers heightens competition and gives users far more bargaining power," Bender said.

One seminar speaker, Liza Draper, Enterprise Network Strategies program director for Gartner Group, Inc., a Stamford, Conn.-based consultancy, said users can use the threat of changing carriers to get a reluctant primary carrier to come up with a custom network proposal.

Draper said this tactic works particularly well with AT&T. "Talking of moving to MCI or US Sprint is the most effective weapon you have for soliciting a Tariff 12 proposal from AT&T," she said.

AT&T is willing to renegotiate Tariff 12 contracts and expand them to cover additional segments of users' networks, Draper said. Several large Gartner Group customers have taken advantage of this willingness, she noted.

John Kies, a senior telecommunications management consultant with Equifax, Inc., an online information services provider in Atlanta, suggested that users

*(continued on page 12)*

## WASHINGTON UPDATE

BY ANITA TAFF

**FCC tables Tariff 15 deal for CBS.** The Federal Communications Commission last week suspended an AT&T Tariff 15 deal for CBS, Inc. for five months while it investigates the deal's legality. The plan would have given CBS a 23% discount on Software-Defined Network domestic and international calls. AT&T told the FCC that the discount was in response to a similar offer made by MCI Communications Corp.

Even though CBS has since decided to purchase its telecommunications services from MCI, AT&T left the offer on the books so that it could respond in case MCI makes similar offers to other customers.

The FCC said last week that the CBS deal raises significant legal issues that warrant investigation. "Single-customer offerings raise serious questions of compliance with the Communications Act prohibition against unreasonable discrimination," the FCC order said.

The commission said the suspension was a severe step to take, but after weighing the potential harm to ratepayers against harm to AT&T, it was necessary. The fact that AT&T no longer has a customer willing to purchase the deal was also a factor in the FCC's decision.

The suspension of the CBS deal came as little surprise to AT&T. In an interview last month, Michael Murphy, director for opportunity analysis and strategic pricing at AT&T, said that given the history of Tariff 15, it was likely the CBS deal would be suspended. It is also likely that the same fate awaits other pending Tariff 15 deals.

The controversy surrounding Tariff 15 stems from provisions in the Communications Act of 1934 that prohibit carriers from

*(continued on page 12)*

## Washington Update

*continued from page 11*

discriminating among customers in providing service. Opponents of the tariff say AT&T, the market's dominant carrier, should not be allowed to offer special pricing to specific users.

The FCC has previously considered the lawfulness of two other Tariff 15 deals but in its order last week, the agency skirted the fact that it has yet to reach a decision on the legality of single-customer discounts.

AT&T's deal for Holiday Corp., the first Tariff 15 deal filed, was rejected as unlawful on the grounds that AT&T limited the discount to Holiday, whereas MCI had made a similar discounted offer available to any customer requesting it.

The second Tariff 15 deal, filed by AT&T for Resorts Condominium International, Inc. (RCI), was allowed to take effect last month after a five-month investigation by the FCC. However, the agency never reached a decision on the legality of the deal. According to FCC rules, once the five-month suspension period is up, the agency must issue a ruling saying the tariff is unlawful or it becomes effective automatically.

RCI is now the sole customer receiving service under AT&T's Tariff 15 but, in addition to CBS, deals are pending for five other customers: The East Ohio Gas Co.; La Quinta Motor Inns, Inc.; Overseas Military Sales Group; Swift Global Communications, Inc.; and PepsiCo, Inc. ◼

## Users urged to look at more custom bids

*continued from page 11*

include stipulations in custom network contracts that enable them to renegotiate the deals at one or more points in the future.

"You can't just take a three- or five-year contract without some kind of out," Kies said. "You have to structure the contract so that it can be renegotiated at times agreed on by the user and the carrier."

Russell Bowen, telecommunications director for Aetna Life and Casualty Co., a Hartford-based insurance firm, said custom networks set under AT&T's Tariff 12 are not cast in stone.

"Users should not consider a Tariff 12 arrangement as a done deal," he said.

Customers that do may miss the chance to pull other services under the original contract and realize greater savings, Bowen said.

Aetna negotiated with AT&T to expand the company's three-year, $10 million Tariff 12 contract, which initially covered several voice services, to include data services as well. "It's a great arrangement for us, and it's a big opportunity for additional business for AT&T," Bowen said. The contract calls for Aetna to run 52 million minutes of traffic a year over the custom net.

Although AT&T is exhibiting flexibility in agreeing to renegotiate and broaden Tariff 12 deals, the carrier may be becoming more rigid when it comes to the length of the contracts, according to Gartner Group's Draper.

"Users that want long-term custom network contracts under AT&T's Tariff 12 should move quickly," Draper said. "If your company is as large as it will get or is looking at divesting some operations, you'll want to negotiate a five-year deal and do it now," Draper said.

> "You can't just take a three- or five-year contract without some kind of out," Kies said.
>
> ▲▲▲

Anticipating deregulation, AT&T is pushing three-year contracts, she added.

"AT&T is thinking it will get what it wants in terms of deregulation," Draper said. "They have little reason to commit to five years of very aggressively discounted service pricing." Thirteen of the last 21 Tariff 12 deals were three-year deals, she said.

With a good deal of the nation's largest users sewn up, AT&T is offering Tariff 12 custom networks to smaller users. Although Draper admitted that the minimum annual charge for the most recently filed options has dropped, she declined to say how much. ◼

## Financial services company picks MCI

*continued from page 11*

particular bid, [all carriers] were equal."

Matthew Kantecki, assistant vice-president of communications services at Household International, said another advantage of MCI is that the carrier has had the same account team working with Household International for some time. "It's very important to find a support team that you like and can work with," he said.

MCI has also shown a willingness to address special requirements of the company, Kantecki said. "MCI has been very flexible, which is important because when new business opportunities come up, you need to react. You don't want to hit a roadblock [with your network provider]," he said.

Although the recent announcement of AT&T's credit card was not a factor in his company's choice of MCI, Household International's Tyska said AT&T's move could affect future decisions it makes about its net since one of its divisions is an issuer of Visa cards and MasterCards. ◼

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See The FAXNet Form on Page #22

# DATA COMMUNICATIONS

PRODUCTS, SERVICES, ARCHITECTURES, STANDARDS AND NETWORK MANAGEMENT

## Worth Noting

"There's been a lot of [network management] platform building in the '80s. What'll really distinguish us over time is developing a full set of applications [to run on top of the IBM platform.]"

**Mark Knittel**
Manager of network management systems
IBM
Raleigh, N.C.

## Data Packets

**Applied Computer Technology (ACT)** last week announced an enhanced version of its personal computer-based test kit for IBM Systems Network Architecture applications.

ACT's SNA Development and Test Facility (SDTF) lets a personal computer emulate mainframes and other SNA physical units for the purpose of testing SNA applications.

The test system has added support for token-ring local-area networks to the existing Synchronous Data Link Control links it already supported.

In addition to LAN support, the test system has also been enhanced with a new menu-based window interface that lets the operator toggle between various communications and testing configurations.

Users of SDTF can employ the product to test applications using various IBM LU types, including LU 6.2/Advanced Program-to-Program Communications.

For testing LU 6.2 applications, SDTF can emulate another peer LU 6.2 system.

In order to test token-ring applications, SDTF can emulate a 3745 front-end processor or a 3174 cluster controller attached to a token-ring LAN.

SDTF is available now. The product is priced between $8,000 and $24,000. ◼

# Codex lowers prices on its net management software

Firm also promises link to Accumaster Integrator.

**By Paul Desmond**
Senior Editor

MANSFIELD, Mass. — Codex Corp. last week announced new pricing aimed at making its network management systems affordable for users that previously couldn't cost-justify them.

Codex also said it plans to supply a link between its high-end 9800 Series Integrated Network Management System and AT&T's Accumaster Integrator.

"We're broadening our horizons in terms of the size of networks we can manage, as well as providing broader interface capabilities through the AT&T interface and the promise of OSI compatibility there," said Jeff Walker, Codex's marketing director of network management.

Under the new 9800 pricing plan, users will be charged for software based on the quantity and type of devices in a net, each of which is assigned a point value.

Transmission products like modems and data service units (DSU) are worth one device point each, while high-end products such as T-1 multiplexers are worth 15 points, Walker said. Customers are charged $10,000 for base software and then pay $7,500 for a license covering their first 100 device points.

That makes the entry-level 9800 — which includes the Hewlett-Packard Co. Apollo Division workstation on which it runs, training, installation and a year of software maintenance — cost about $40,000, according to Walker.

As networks grow, the cost of additional points goes down. The next $7,500 buys 120 device points and then 140 points, on up to a maximum of 200.

Previously, the 9800 was priced according to the type of devices a user needed to manage, Walker said. Software for each product managed by the 9800 — including modems, DSU/channel service units (DSU/CSU), statistical multiplexers, packet-switching equipment and T-1 multiplexers — was sold separately. Users paid the same price for the software, regardless of how many of each device needed to be managed.

Codex's Release 4 of its 9300

*(continued on page 14)*

# *Carrier plans Caribbean service for travel agents*

**By Jim Brown**
Senior Editor

BRIDGETOWN, Barbados — Cable & Wireless PLC last week said it plans to offer a network-based hotel reservation system that will enable travel agents worldwide to book rooms at resorts on 17 Caribbean islands.

The hotel reservation service, called the Caribbean Hotel Association Reservation and Management System (CHARMS), eventually will enable travel agents to tap into the network to check on room availability and make reservations, rather than call hotels here.

CHARMS will be supported by a Stratus Computer, Inc. transaction processor that was recently installed on the carrier's Travel Agent Reservation Exchange (TAREX) net here as part of an upgrade called TAREX 2, said John Slaytor, TAREX 2 manager.

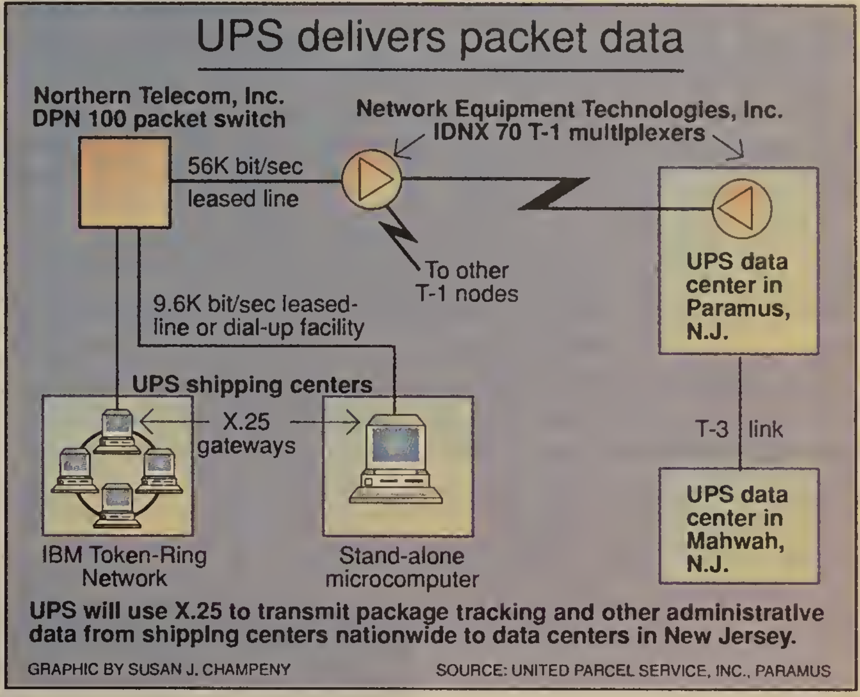
When implemented later this year, CHARMS initially will enable a travel agent outside the Caribbean to dial a toll-free number to reach a reservation agent here. That agent will tap into the CHARMS data base from a terminal and advise the other agent about room availability.

Eventually, Cable & Wireless plans to offer links to CHARMS so travel agents outside the Caribbean can access the service from terminals in their own offices, but the carrier declined to say when it would provide that capability.

Caribbean-based travel agents will be able to access CHARMS from terminals in their offices via the new TAREX 2 net. Agents currently use a switching application running on the newly installed Stratus, which provides them with access to major airline reservation nets.

That switching application includes protocol conversion and message routing routines that link terminals in the Caribbean travel agent offices to the mainframe-based reservation systems at Pan American World Airways, Inc. in Rockleigh, N.J., British Airways PLC in London, British West Indies Airways International on the Caribbean island of Trinidad, Air British Virgin Is-

*(continued on page 14)*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Northern Telecom, Inc. DPN 100 packet switch
Network Equipment Technologies, Inc. IDNX 70 T-1 multiplexers
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To other T-1 nodes
9.6K bit/sec leased-line or dial-up facility
UPS data center in Paramus, N.J.
UPS shipping centers
X.25 gateways
T-3 link
IBM Token-Ring Network
Stand-alone microcomputer
UPS data center in Mahwah, N.J.

UPS will use X.25 to transmit package tracking and other administrative data from shipping centers nationwide to data centers in New Jersey.

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: UNITED PARCEL SERVICE, INC., PARAMUS

# UPS to merge mix of traffic onto T-1 pipe

Package delivery giant begins net overhaul to improve service, expand its business abroad.

**By Jim Brown**
Senior Editor

PARAMUS, N.J. — United Parcel Service, Inc. (UPS) recently completed installation of a T-1 backbone that will consolidate voice, data and image traffic from several nets onto a single net.

The package delivery giant said the T-1 network, called UPSnet, will play an important role in its five-year, $1.4 billion information systems overhaul, which is designed to improve customer service and enable it to expand its business overseas ("Int'l network helps UPS set sights on global market," *NW*, Oct. 10, 1988).

The T-1 backbone is just the first phase in building UPSnet. UPS will begin installing X.25 packet switches in 39 locations across the country.

Those packet switches will aggregate data — including shipping information and package label images — from X.25 gateways in UPS shipping centers and feed it to the T-1 backbone, which will then route the traffic to a data center here or in Mahwah, N.J.

UPSnet will eventually replace an existing private voice net and hodgepodge of data nets, each of which supported only a single application such as package tracking or administrative functions.

"The intent is to provide universal transport between all UPS locations," said Steve Heit, information services planning manager.

To form the UPSnet backbone, the company installed a mesh T-1 network of Network Equipment Technologies, Inc. Integrated Digital Network Exchange (IDNX) 70 multiplexers in Chicago, Dallas, Los Angeles, Louisville, Ky., Mahwah and Paramus.

In addition, UPS has already installed a T-3 circuit between Mahwah and Paramus that will enable it to transmit data between hosts in those data centers.

With the backbone in place, UPS will now install Northern Telecom, Inc. DPN 100 packet switches in its 39 district locations. UPS is also outfitting its largest shipping centers with IBM Token-Ring Networks running Novell, Inc.'s NetWare, while smaller centers are being equipped with stand-alone microcomputers. These setups replace the minicomputers and attached terminals that were previously used to record shipment data that was then uploaded to a mainframe.

The X.25 gateways at those shipping centers will route packets to the nearest DPN 100 via 9.6K bit/sec leased lines or dial-up facilities. The DPN 100 will be linked via 56K bit/sec circuits to the nearest IDNX 70.

The network overhaul is part of UPS' overall strategy to better serve customers in an increasingly competitive shipping industry, Heit said. "As customers, like retailers, try to lower their inventory and move toward using just-in-time systems, they require more and more information from their package carriers," he said.

To satisfy that need, UPS wants to offer customers on-line access to package tracking and tracing applications running on its mainframes via UPSnet.

The need to extend package tracking services to users was so acute that UPS did not even wait for UPSnet to be finished before it

*(continued on page 14)*

## Carrier plans Caribbean service

*continued from page 13*

lands on the island of Tortola and Leeward Islands Air Transportation on the island of Antigua.

In addition, some airlines use TAREX to link terminals at airport ticket counters throughout the islands to their respective hosts.

Prior to the upgrade, TAREX linked terminals to different airlines' hosts using protocol converter and switching hardware made by Videcom, Ltd., a British data communications equipment vendor.

In the TAREX 2 upgrade, Cable & Wireless swapped out Videcom terminals and controllers it had rented to Caribbean travel agents and airlines and replaced them with Memorex Telex Corp. terminals and controllers. It also replaced Videcom 1,800 bit/sec modems with Racal-Milgo modems operating at 2,400 bit/sec.

Travel agents and airports on each island are linked via multidrop 2,400 bit/sec analog terrestrial lines to a digital microwave radio site on each island.

Data is relayed between microwave radio transmitters on each island until it reaches the operations center here. Cable & Wireless then uses a 64K bit/sec satellite circuit to provide the link to British Airways' host and a 4.8K bit/sec undersea cable circuit to reach Pan Am's host. These hosts are directly linked to other airlines' hosts, enabling Caribbean travel agents to book flights on most airlines. ☒

## Codex lowers prices on software

*continued from page 13*

Series management system adds support for the company's 6500 family of low-end and mid-range X.25 packet assembler/disassemblers and packet switches. Previously, the system supported modems, DSU/CSUs and statistical multiplexers.

A remote access capability was also added that lets users dial into the 9300 from a remote asynchronous terminal.

In an effort to help reduce the total cost of the 9300 system for users with personal computers, Codex will specify other personal computers capable of running the 9300 software besides the HP Vectra it has traditionally sold with the software. Plus, Codex cut the price of the software itself by $3,500.

For $4,600, users can buy an entry-level 9300 software-only package for managing Codex modems. Previously, the same package cost $13,000, although that price included an HP Vectra. The software is scheduled to be available this month.

### Surprise to no one

Codex's announcement that it will develop a link between the 9800 and AT&T's Integrator came as no surprise to analysts.

Frank Dzubeck, president of Washington, D.C. consultancy Communications Network Architects, Inc., said Codex should have supported the Integrator when it was first announced, although he said the move makes Codex the first vendor to announce support for the integrated net management strategies of all three major players in that market: AT&T, Digital Equipment Corp. and IBM.

Walker said users only recently started asking for an Integrator link.

When the link is delivered later this year, it will only feed net management data from the 9800 to the Integrator; it will not allow the Integrator console operator to control the 9800, although Walker said that capability will be added at a later date.

Pricing is not yet final, but Walker said the 9800/Integrator link, which consists of a software upgrade to the 9800 system, will cost around $15,000. ☒

## UPS to merge mix of traffic onto T-1 pipe

*continued from page 13*

offered users such a service.

"In the early stages of this project, we didn't allow the [lack of a backbone] network to be a constraint," Heit said. "If we had to take some short-term routes to cover ourselves for an interim period, that is basically the approach we took."

Several hundred UPS customers currently use the X.25-based IBM Information Network (IIN) to access UPS mainframes in order to track their packages. Alternatively, customers can access UPS hosts via IIN to request traces on overdue packages that were not tracked. "We took advantage of the fact that many of our customers already had connections to the IBM Information Network," Heit said. However, those customers will be supported by UPSnet once it is fully up and running.

UPS also uses existing international public X.25 services to transmit package tracking data from international locations to its data center here. This enabled UPS to roll out its International Shipping Processing System (ISPS) years ahead of UPSnet's availability and allowed the company to expand from serving just three countries four years ago to 180 today, Heit said.

ISPS is used to track packages traveling between countries. Uploading package tracking information to mainframes here also enables UPS to prepare electronic versions of customs documents for packages crossing international borders. Those electronic documents can be delivered to customs agents before the packages arrive at the border, thus speeding the process of clearing packages through customs.

Under ISPS, microcomputers in UPS shipping centers in each country are linked via dial-up X.25 services to a UPS-owned IDNX T-1 node in either Cologne, West Germany, or London. UPS then routes the traffic via two 256K bit/sec undersea circuits to its data center here. ☒

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| 3 | MIGRATING FROM MAINFRAMES TO A WINDOWS LAN | APPLICATION SUITES | NETWORK TUNING ISSUES | MEDIA | EUROPE EAST & WEST | IMAGE PROCESSING & WINDOWS |
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**Eric Benhamou**
President and
chief operating officer
3Com Corp.
Santa Clara, Calif.

## Netnotes

**Integrated Workstations, Inc.** recently introduced an asynchronous communications board that can be installed directly in a Novell, Inc. NetWare file server, providing local-area network users with dial-in and dial-out capabilities.

The RemoteStation/286 has an Intel Corp. 80286 microprocessor operating at zero wait states, up to 4M bytes of memory, a built-in net interface, a serial port, a connector for a modem and a choice of graphics adapters.

The board is compatible with both Advanced NetWare 286 and NetWare 386, and can coexist with other cards in the server because it does not use I/O addresses or Direct Memory Access channels. Multiple RemoteStation/286s can be installed in a single server.

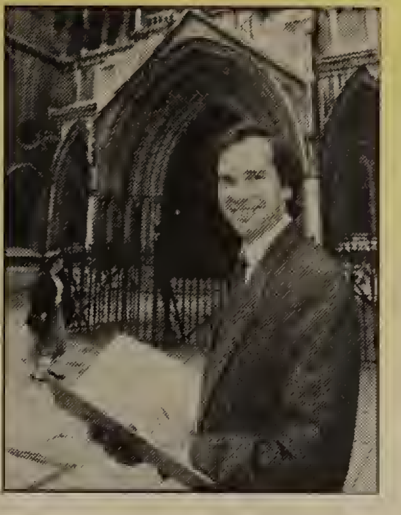
Data is transferred in parallel across the bus rather than serially across a network cable. According to the company, this produces data transfer speeds that are up to five times faster than traditional LANs.

The RemoteStation/286 costs from $1,245 to $1,895, depending on configuration. The product is available now.

Integrated Workstations can be contacted at 1648 Mabury Road, San Jose, Calif. 95133; (408) 923-0301.

"Since the two favorable rulings by the U.S. patent office and the U.K. high court, several distributors who had been scared off by the lawsuit have now decided that it's safe to carry our token-ring product line."

**Robert Madge**
President
Madge Networks, Ltd.
London



# Rulings leave token-ring, FDDI firms hopeful, wary

### Companies wait for outcome before taking action.

**By Laura DiDio**
Senior Editor

Cautious optimism is the reaction of most token-ring and FDDI vendors in the wake of decisions by U.S. patent officials nullifying key portions of Olof Soderblom's token-passing patent and a U.K. high court's dismissal of the patent infringement suit he brought against Madge Networks, Ltd.

Although Soderblom and his attorneys have said they will appeal both rulings, the decisions are arguably the first step in rending null and void the current licensing agreements Soderblom has with more than 50 vendors of token-ring and Fiber Distributed Data Interface products, including IBM.

### Holding their tongues

Most vendors contacted last week were reluctant to speak on the record for fear of reprisals should Soderblom ultimately prevail in the courts.

Privately, however, Soderblom licensees said the decisions by the U.S. Patent and Trademark Office and the High Court of the U.K. are forcing them to reexamine the validity of their current licensing agreements.

"We're looking at getting out of the contract," said one token-ring vendor. "Based on the latest actions, we think we have a good shot at voiding our agreement. But we're keeping quiet until all the cases are resolved, and that will take at least another year."

Vendors currently negotiating agreements with Soderblom — most of which are in the FDDI arena — said they've adopted a wait-and-see stance and will hold off signing any agreements with Soderblom until all the cases are resolved.

"We're currently negotiating a license with Soderblom, and we'll just keep right on negotiating. But don't expect us to sign anything unless Soderblom prevails in the end," an executive at a West Coast FDDI concern said. "Right now, it doesn't look like that will happen."

An official at another West Coast firm that is currently negotiating a token-ring licensing agreement said his company is taking a similar tack.

"A lot of vendors, including our company, will put their licensing negotiations with Soderblom on hold until the final determinations by the patent office and the U.S. District Court in San Francisco," he said.

Vendors negotiating with Soderblom said they've adopted a wait-and-see stance.

▲▲▲

A spokesman for IBM, one of the first to license Soderblom's technology, said the company is watching the developments in the case and will investigate its options. The IBM spokesman declined further comment pending the final outcome of the case.

### Waiting to celebrate

Wayne Harding, an attorney with Arnold, White and Durkee in Houston, which filed the reexamination request for an anonymous vendor, tempered his enthusiasm with pragmatism. The April reexamination request led to the patent office's recent decision to negate those portions of the patent that cover the open and closed loop scheme defined in the IEEE 802.5 specification.

"We've won the first round," Harding said. "The patent office's actions were particularly

*(continued on page 16)*

# NetWare guru lays out developments

### Says IPX problems nearly resolved, hints at new TCP/IP products and discusses client/server issue.

**By Susan Breidenbach**
West Coast Bureau Chief

SAN JOSE, Calif. — Attendees at the recent NETUCON '90 NetWare user conference here were briefed by NetWare chief architect Drew Major on the new and pending enhancements for the network operating system that Major and two colleagues created back in 1981.

Major said Novell had licked the wide-area performance problems of its Internetwork Packet Exchange (IPX) protocol, and he hinted at forthcoming Transmission Control Protocol/Internet Protocol products that would set new speed standards. He also discussed how NetWare will stand up against OS/2 and Unix.

"One of the things that is bothering me is that when you read the press, you get the impression that people think the servers of the future are going to be based on either OS/2 or Unix," Major said. "There's been some good selling done by some of our competitors to the effect that Novell has a great DOS solution but that the long-term evolution is going to be away from Novell and toward these more general-purpose platforms."

From Major's point of view, nothing could be further from the truth. He ticked off a number of reasons why sticking with NetWare is a safe choice for users in the long term.

First and foremost, he said, it is important to understand NetWare's roots in order to see why the operating system is not simply DOS-oriented. The initial version of NetWare in 1981 ran on a Motorola, Inc. 68000 processor, and the original intent was to provide transparent connection among the CP/M, DOS and Unix environments.

"By the time we got CP/M done, no one wanted it anymore, and we didn't know enough about Unix at the time," Major said. Fortuitously, Novell focused on DOS

*(continued on page 16)*

# *Castelle's dedicated print server supports NetWare*

**By Susan Breidenbach**
West Coast Bureau Chief

SANTA CLARA, Calif. — Joining Microtest, Inc. and Intel Corp. in the emerging market for print servers, facsimile server specialist Castelle, Inc. has announced a four-port dedicated server for Ethernets runnning Novell, Inc.'s NetWare.

The print server can be directly connected to a local-area network cable at any point in the network, eliminating the need to attach printers to file servers or designated personal computers acting as print servers.

The devices are being received enthusiastically by users. According to one LAN administrator at a major commercial bank, "The hardest part about installing these printer ports is getting them out of the Federal Express box they come in."

Called LANpress, Castelle's offering has one serial and three parallel ports. It includes firmware that supports NetWare's print utilities, enabling users to access printers, spool print jobs and control printing just as they do with printers attached to file servers or workstations.

The device also supports the encrypted passwords available under NetWare 386.

According to Pete Moruzzi, director of product marketing for Castelle, LANpress has a couple of features not available from the competition. For one thing, each of the device's four ports can serve multiple print queues on as many as eight file servers, thus providing considerable flexibility for streamlining shared printer operations.

Also, LANpress supports thin and thick Ethernet. The latter enables the device to be adapted for use with a 10BaseT LAN by attaching it via coaxial cable to a 10BaseT repeater, Moruzzi said.

One complaint users have had about the new print server products is that they aren't modular in design so that the user can choose any combination of port types.

According to Moruzzi, the vendors are currently constrained by the available chipsets, which make such modularity difficult and expensive to implement.

LANpress is available now at a price of $795.

## Guru lays out developments

*continued from page 15*

and was able to ride the growth of the IBM Personal Computer market.

"But our focus has always been to connect different environments," Major insisted. That sets Novell apart from network operating system vendors who are "really promoting their own client system software, their own hardware box or their own LAN card."

To acquire needed expertise in Unix and its associated TCP/IP networking, Novell acquired Excelan, Inc. in 1989. A self-acknowledged "performance freak," Major indicated that he was initially concerned about the merger because TCP/IP is no speed demon.

"We told them, 'We need your products, but we need them to be superfast,' " Major said. The Excelan people rose to the challenge, he said, and are readying some products that will lift the performance of TCP/IP networking to a new level.

He also countered claims that NetWare was not architected for client/server computing. "NetWare 386 is a specialized server operating system that handles file and print services very well, but it is a lot more — a platform for developing back-end, server-based applications," he said. "It was designed from the ground up to facilitate those types of applications."

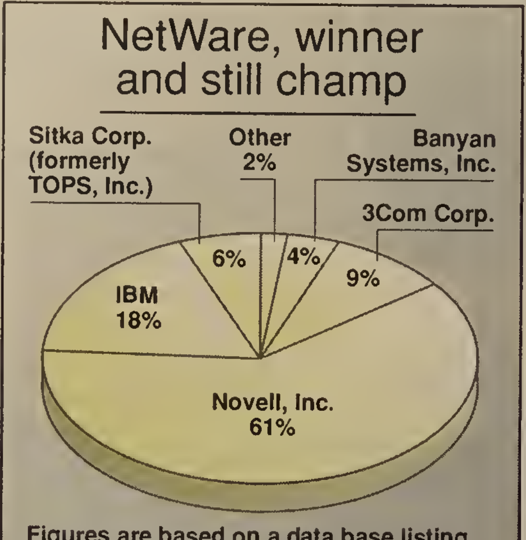
According to Major, such back-end products run faster on NetWare than they would on a more general-purpose platform such as OS/2 or Unix.

"People that compete with us typically run their network operating systems as applications on top of a general workstation operating system," Major said. "That's an OK approach, and there are places where it's needed. I have tremendous respect for our competitors and appreciate them, actually, because they help us see where we are screwing up sometimes.

"But I think that, in the long term, we will have some fundamental performance and functionality advantages over them because of the specialized nature of our approach," Major explained.

However, he cautioned against the tendency to get carried away by the client/server paradigm. "Most applications don't really need to have a server component other than centralized file service, and we are unsurpassed in being able to support distributed computing when the whole application runs on the workstation," he said.

Major also expressed optimism that, in the interest of promoting standards, there would be increased cooperation between Novell and Microsoft Corp. in the future.



Figures are based on a data base listing products used at 20,000 user sites.

SOURCE: COMPUTER INTELLIGENCE, LA JOLLA, CALIF.
GRAPHIC BY SUSAN J. CHAMPENY

"We were there first and defined our own set of primitives for doing things like record locks," Major said. "When Microsoft comes and defines a different set a year or two later, we have to go and emulate it. Hopefully, we're going to be able to work with Microsoft to converge those two sets of standards."

In the realm of NetWare performance, Major said Novell is getting close to solving the problems its IPX protocol causes when running across the relatively slow lines and multihop links often found in wide-area networks. Improvements to the NetWare Core Protocol will boost NetWare performance significantly in both the WAN and LAN environments, he said.

The enhanced Network Core Protocol, coupled with some disk optimization, is "50% faster coming off the disk than the old protocol was coming out of cache," enabling a single workstation to achieve 1M byte/sec file I/O, Major said.

"What we've done is squeezed all the round-trip latency of the request/response protocol out of the system, along with some of the latency of going to the disk." The enhancement is not in the just-released NetWare 386 3.1, but it is already being used inside Novell and will be a product sometime soon, Major said.

### Fault tolerance

Major also addressed the issue of System Fault Tolerant NetWare Level III (SFT III), which provides total hardware fault tolerance via mirrored servers. SFT III has become a sore point for some users because it was announced several years ago and still does not have a scheduled delivery date.

"We are actively working on our SFT III product; it is not a pie-in-the-sky thing," Major stated. "It doesn't require Compaq [Computer Corp.] hardware. It will work better if you have two processors in one server, but that's not required. It will run on any two 386 boxes." Compaq and Novell are working together on SFT III for Compaq's multiprocessor SystemPro superserver.

Major said SFT III is the only reason Novell sees for supporting symmetric multiprocessing under NetWare. "NetWare is so efficient that the processor is not the problem. We bottleneck on hardware buses and LAN adapters, not in our software."

Asymmetrical multiprocessing is evidently another matter, though. Now that NetWare has been opened up for server-based applications such as data base engines, those applications could start taking too many CPU cycles away from basic file and print services.

"At that point, it might be better to put the applications on another CPU," Major acknowledged. "We're actively looking at that."

Major said the move toward distributed

*(continued on page 44)*

## Rulings leave firms hopeful

*continued from page 15*

strong because they were signed by three levels of examiners. That should make it more difficult for Soderblom to overturn the decision, but it's not over till it's over."

If the higher court upholds the patent office's ruling — which negated key claims in Solderblom's patent — Soderblom will be forced back to the narrower claims in his original 1981 patent, which only covered a master/slave token-passing transmission scheme.

Most vendors and industry analysts contend that those specifications are too narrow to allow Soderblom to collect licensing fees from token-ring and FDDI suppliers.

### Lower end-user costs

Vendors concurred that end users will be the beneficiaries of lower priced token-ring and FDDI offerings if the patent office's decision withstands appeals by Soderblom and his attorneys and if Madge prevails in a second ongoing lawsuit in a San Francisco federal district court.

Under the current licensing structure, Soderblom receives a maximum royalty of $50 on 4M and 4M/16M bit/sec token-ring adapters and as much as $275 on the price of an FDDI adapter, depending on the volume of parts sold.

Robert Madge, Madge Networks' president and founder, said vendors typically add the cost of their licensing fees for Soderblom into their manufacturing and overhead costs.

"We automatically pass the cost of licensing fees on to our end users. By not having to pay Soderblom royalties, we'll be able to pass our savings on," Madge said. "It will also encourage more vendors to enter the market and promote competition, which will also ultimately lower costs."

Soderblom's patent has been subjected to several challenges in U.S. patent offices over the last six years, many of which have been settled out of court. The Madge case is the only case against Soderblom that has actually gone to trial, and the latest ruling by the patent office marks an about-face in that organization's prior stance.

After a six-day trial in London, the chief patent justice in the High Court of the U.K. ruled that Madge Networks' token-ring products do not infringe on Soderblom's token-passing patent.

An official at a West Coast token-ring and FDDI company who requested anonymity said the actions by the patent office and the English court validate widely held industry beliefs that Soderblom's patent does not cover token-ring technology as laid out in the IEEE 802.5 specification or the emerging FDDI technology, which is also based on a token-passing scheme.

"His claims on IEEE 802.5 token-ring and FDDI technology are totally bogus," the official said. "I've never felt his claims were earned or deserved. The whole situation has been an extremely adroit legal tour de force by Soderblom and his attorney, but finally, the end is in sight."

Soderblom said he remains undaunted by the adverse decisions and will appeal the decision in the U.K. His Washington, D.C.-based attorney, George Van de Sande, will also file a rebuttal with the U.S. patent office.

If that rebuttal is denied, Soderblom said he will appeal that ruling as well. ◻

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See The FAXNet Form on Page #22

# MANAGEMENT STRATEGIES

**MANAGING PEOPLE AND TECHNOLOGY: USERS GROUPS AND ASSOCIATIONS**

## Dialogue

**Do you have an interest in using virtual network data services such as AT&T's Software-Defined Data Network (SDDN), which was announced last month? If so, why?**

" We are moving toward virtual data services such as SDDN and ISDN because they will enable us to provide a high degree of network uptime at less cost. Currently, we lease T-1 circuits for backup in case there's a fault on the network. SDDN would provide us with diverse routing and bandwidth on demand without the cost of maintaining backup T-1 circuits.

"Besides backup, we would also use virtual data services for videoconferencing, disaster recovery and LAN-to-LAN connections, among other things. We are pursuing a 384K bit/sec switched data service from AT&T for these applications."

**Pat Pilosi**
Communications consultant
Harris Corp.
Melbourne, Fla.

" SDDN will be an easy way to send data traffic over our wide-area network and interconnect a number of Ethernet LANs we are building. Since we already have T-1 access to several AT&T point-of-presence locations, SDDN will have minimal call setup times compared with other switched services.

"Also, if a company generates less than five hours of data traffic a day, SDDN will be less expensive than private lines. AT&T plans to offer a 384K bit/sec service through SDDN this year. That will increase the attractiveness of using switched data over private lines."

**Lewis Weinstein**
Telecommunications manager
Morgan, Lewis & Bockius
Philadelphia

" We would use switched data services such as AT&T's SDDN primarily to connect smaller locations that don't warrant a separate leased line. Also, we would use them for disaster recovery. The services would allow us to pull up a large-bandwidth circuit on demand, rather than having to maintain a dedicated line."

**Jeff Owen**
Operations manager
Corporate telecommunications laboratory
Hughes Aircraft Co.
Long Beach, Calif.

### Barriers to implementing strategic applications

**Strategic applications are difficult to define:**

- Generating workable ideas requires leadership and teamwork.
- Many ideas are technically infeasible.
- Many ideas are too expensive.
- Many ideas don't have a sufficient market.

**Strategic applications are difficult to implement:**

- Networks increase system complexity.
- Multiple systems are difficult to integrate.
- Requires interorganizational cooperation.
- Advanced technologies may not work as promised.

**Strategic applications are difficult to maintain:**

- Applications can often be copied.
- Unanticipated user demand can overwhelm systems.
- Applications can be expensive to maintain or enhance.

SOURCE: CENTER FOR INFORMATION SYSTEMS RESEARCH, MASSACHUSETTS INSTITUTE OF TECHNOLOGY, CAMBRIDGE, MASS.

# Study identifies pitfalls to strategic IS net projects

Lists 11 barriers to successful implementation.

**By Wayne Eckerson**
Senior Writer

CAMBRIDGE, Mass. — Many companies are unaware of the barriers and risks involved in developing strategic information systems (IS), according to a new study by the Sloan School of Management at the Massachusetts Institute of Technology here.

The widespread publicity of several IS success stories, such as American Airlines, Inc.'s SABRE computer reservation network, has overshadowed the difficulties and challenges many companies face in developing strategic information systems, the report said.

To help managers recognize potential pitfalls, the study describes 11 common barriers to developing strategic information systems and offers numerous examples of unsuccessful corporate projects to illustrate each. It also presents a matrix that companies can use to gauge which barriers pose the greatest threats to their strategic projects.

The report, titled "Systems Development Risks in Strategic Information Systems," was written by Chris Kemerer, a professor of information technology, and Glenn Sosa, a researcher, both of the Sloan School of Management. The study is based on confidential interviews with eight large U.S. firms and articles that have appeared during the past two years in the general business and trade press.

According to the study, the barriers that companies face in developing strategic IS systems can be broken down into three categories: defining, implementing and maintaining strategic systems (see graphic).

Many companies run into roadblocks because they are unable to define ideas for strategic systems that are technically feasible, affordable and appeal to a large base of customers.

Companies hobbled by a lack of vision or leadership often have a difficult time defining strategic ideas that have merit, the study said. Executives that do not encourage experimentation and accept occasional failure can stifle the creative thinking that leads to workable ideas.

Also, many companies are hindered by the inability of technical managers and business managers to communicate clearly or understand one another.

Once companies generate an idea for a system that can provide a strategic advantage, they often find they cannot build it. Many strategic systems rely heavily on communications nets or leading-edge technologies, and often companies underestimate the difficulty of putting such systems together, the study said.

The number of network technologies, standards, communications protocols and vendors, as well as the shortage of skilled workers, can overwhelm the ability of many companies to convert a strategic idea into a working system.

Also, strategic systems often cut across traditional organizational boundaries and require a large degree of cooperation among departments or autonomous business units. Many strategic systems never materialize because companies cannot elicit interorganizational cooperation, the study said.

Finally, many companies that conceive of and build strategic

*(continued on page 18)*

# DEC's net makes the world one big office

Networking advances let vendor bring together engineers in many locations to work on projects.

**By Wayne Eckerson**
Senior Writer

CONCORD, Mass. — Networking technologies are making it easier for managers to supervise foreign-based employees and are encouraging the rearrangement of traditional office boundaries.

Digital Equipment Corp.'s corporate telecommunications department uses a range of network technologies — including videotex, electronic mail and audioconferencing — that enable more than 70 engineers located in six offices throughout the world to keep in close touch.

DEC's Mark Endry

"Networking has enabled us to create a 'virtual organization' in which engineers in different locations can work together on joint projects as easily as if they're in the same office," said Mark Endry, manager of telecommunications engineering at DEC.

DEC's telecommunications group uses the company's worldwide integrated voice/data net to exchange voice and data messages and to communicate with colleagues using video workstations, audioconferencing and other technologies (see graphic, page 18).

Networking has given Endry, who heads the telecommunications department, greater flexibility in assigning engineers to projects without regard to their office location. Instead of creating a project team comprising en-

*(continued on page 18)*

**GUIDELINES**

BY ERIC SCHMALL

## Maintaining objectivity in face of vendor bribes

When does a network manager's objectivity become compromised by a salesperson's generosity?

Is it proper to accept a coffee mug or a beach towel with the vendor's logo on it? Or to let a salesperson spring for a big lunch? Should a network manager accept a pair of tickets to a sports event?

Most network managers consider themselves ethical and objective, but many don't realize how easily their objectivity can be compromised. A person's objectivity erodes slowly, often imperceptibly, every time they accept a gift — no matter how small or seemingly innocent — from a vendor.

There are few things more damaging to an organization than having key people lose their ability to make objective purchasing decisions. Managers who are partial to certain vendors make poor decisions. They often fail to hire vendors that can provide the best service at the lowest price. These managers risk losing credibility in the organization and jeopardize opportunities for advancement. To avoid these problems, net managers need to establish clear guidelines about what they and their staff can and cannot accept from vendors, especially in the absence of any general rules issued by the company.

But most importantly, net managers must lead by example. Managers who fill their offices with vendor knick-knacks may cause others to question their objectivity when it comes to certain vendors. Network managers should remain above suspicion or risk losing the support and trust of others.

As competition heats up, vendors are more than eager to spread their goodwill in any small way they can. Now more than ever, prudent managers and their staffs need to be vigilant about maintaining their objectivity. ■

# Study identifies pitfalls to IS projects

*continued from page 17*

systems discover that potential benefits are much lower than anticipated.

Some systems are expensive to maintain and enhance in order to stay ahead of the competition, draining corporate budgets. Also, strong competitors can copy and quickly implement strategic ideas, minimizing any gain in market share. At the other end of the spectrum, strategic systems can be hugely successful, overwhelming system capacity faster than the system can be upgraded. This can create embarrassing delays that hurt product growth, the study said.

According to the study, companies that want to avoid the pitfalls involved in building strategic IS systems need to consider how they stack up against their competition in three areas: monetary resources, technological sophistication and organizational flexibility.

Companies whose expenditures for IS or other technical projects or whose general financial health falls behind that of their competition will have difficulty overcoming certain barriers described in the study. Specifically, these companies will have trouble identifying strategic IS projects that they can afford to build and maintain. These companies will also have trouble attracting skilled workers who command high salaries. As a result, they may have to rely heavily on vendors.

Companies that are less technically sophisticated than their competitors will have difficulty overcoming other barriers. Those that do not have experience using technology to solve business problems, for example, will have a tough time devising and implementing leading-edge systems.

Finally, firms that rate behind their competitors in organizational flexibility will have trouble getting disparate departments to cooperate in developing strategic systems. Companies that are flexible usually have a heterogeneous work force in which employees come from a range of backgrounds and work together through rotating schedules or flexible assignments.

"Managers need to secure the financial, technical and organizational resources prior to embarking on a strategic information system project," the study stated. ◘

# DEC's net makes the world one big office

*continued from page 17*

gineers from a single site, Endry can form teams based on the expertise and availability of all staff engineers. Also, networking has allowed the telecommunications group to provide better support to DEC's operations in Europe and to tap into a wider pool of skilled engineers.

Three years ago, the group was primarily based in the corporate telecommunications office here. Major telecommunications projects in Europe and elsewhere were coordinated by engineers in this office. Since then, Endry has established corporate telecommunications offices in Augusta, Maine, Littleton, Mass., Helsinki, Finland, as well as the French cities of Valbonne and Ferney-Voltaire. Each of these locations is home to a major DEC development facility and a number of DEC engineers with communications expertise.

Having network engineers overseas has, in effect, made corporate telecommunications more sensitive and responsive to the special needs and requirements of DEC facilities abroad, Endry said.

## DEC's virtual office

**Technologies that enable DEC engineers in three countries to collaborate on projects:**

- ☐ Videotex
- ☐ Electronic mail
- ☐ Electronic bulletin boards
- ☐ Audioconferencing
- ☐ Voice mail
- ☐ Distributed slide shows
- ☐ Video workstations
- ☐ Photo phones
- ☐ Videoconferencing

SOURCE: DIGITAL EQUIPMENT CORP., CONCORD, MASS.
GRAPHIC BY SUSAN J. CHAMPENY

"By distributing our staff to Digital locations, we come up with better solutions," Endry said. "It provides a multidimensional perspective that you don't get when you are rooted to a single site."

### How and when

While the telecommunications group did not have to set up a new network to communicate, it did establish procedures and rules for using the capabilities.

Endry said he advises staffers to consider the content, audience and urgency of a message prior to selecting which network technology to use. For instance, project review sessions or budget meetings in which a project team of 10 to 15 people must interact simultaneously is best handled by audioconferencing.

Electronic bulletin boards are good for querying all DEC engineers on a particular topic that is not pressing in nature, such as the viability of a certain advanced technology. Personal messages or daily progress reports between two people are best handled by E-mail or voice mail.

Videotex is used to check companywide or departmental information that does not need to be updated, such as organizational charts, project descriptions, software standards and job descriptions.

"While most of the networking technologies we use were available three years ago, we have learned how and when to employ them better," Endry said. ◘

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See The FAXNet Form on Page #22

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# INTERNATIONAL NETWORKS

USER STRATEGIES, INTERNATIONAL SERVICES & REGULATION

## Worth Noting

> "Twenty years ago, telecommunications wasn't even among the top 40 factors [that companies] evaluated when choosing a [country] for a factory. Now, depending on the industry, it's in the top 10."
>
> **Kas Kalba**
> President
> Kalba International, Inc.
> Lincoln, Mass.

## World News

**Racal-Milgo** is supplying modems and net services to three West German banks setting up branches in East Germany as part of the economic reunion of the two countries.

The three banks, Deutsche Bank, Dresdner Bank and Berliner Sparkasse, will use about 1,100 Racal-Milgo modems and network support services as they expand their operations into East Germany.

Sunrise, Fla.-based Racal-Milgo has been selling its products in East Germany for several years on a special case-by-case basis. When talk of reunification started, the company was given approval by the East German telephone administration to use the Omnimode and VI2422PA modems.

The Omnimode modems run at 9.6K bit/sec, and the VI-2422PAs run at 1,200 and 2,400 bit/sec.

The Dresdner Bank will use 600 Racal-Milgo modems to connect terminals in East Germany with its computer operations center in Frankfurt, West Germany. Deutsche Bank, West Germany's largest bank, placed an initial order for 200 Omnimode modems and is expected to order another 200 to link its East German branches to its West German headquarters. Berliner Sparkasse said it will be using 100 of the modems for the same purpose. ◻

# Seattle considers feasibility of building area teleport

### Facility could be used as gateway to Pacific Rim.

**By Walter Sweet**
West Coast Correspondent

SEATTLE — The Port of Seattle is studying the possibility of establishing a teleport to provide telecommunications services to businesses in the area and to serve as an international gateway for the Pacific Rim.

Port officials said they hope the proposed Teleport Seattle, with an advanced communications infrastructure and the possibility of telecommunications rates 15% to 20% lower than existing charges, will attract international businesses to the area.

The port is planning to build a fiber loop through downtown Seattle to provide local bypass services to large businesses in the city. The teleport could support voice, data, facsimile, telex and possibly videoconferencing traffic. Port officials said they will not know for sure which services the teleport will offer until a feasibility study is completed next month.

Port officials will entertain bids from AT&T, MCI Communications Corp. and US Sprint Communications Co. to provide domestic and international points of presence into the teleport. The teleport, which should be operational by the end of 1991, is expected to cost $10 million to construct, port officials said.

Port officials began considering a teleport shortly after they entered into an agreement with the Port of Singapore to exchange ship arrival and departure times, as well as electronic data interchange files supporting cargo bills of lading.

Officials decided they could establish individual links with each international port or develop a teleport to handle communications with many countries. They opted for the teleport because it could also provide foreign shippers with a link to the port's own tracking net, which could be used to monitor shipments.

Most of the port's international shipping traffic comes from China, Hong Kong, Japan, Korea, the Philippines, Singapore and Taiwan.

"What we don't have is a link for our overseas customers so that they can track their cargo," said Cecil Patterson, director of information systems with the Port of Seattle. "The feeling is that the best way to do that is through a teleport."

The port is responsible for handling more than $25 billion in

*(continued on page 22)*

# *U.K. postal service looks to become telecom carrier*

**By Adrian Morant**
IDG News Service Paris Bureau

LONDON — Figuring it can do far more than deliver the mail, the British Post Office is aiming to become the U.K.'s third major telecommunications carrier.

The post office recently launched a new service that enables users to route switched voice traffic across British Post's existing private network of more than 200 nodes.

The service will be sold through National Network, a start-up that recently purchased the rights to resell capacity from the British Post's massive internal net. National Network is led by entrepreneur Michael Davis, who invested $1.6 million of his own money to start the venture.

National Network will offer users connections to British Post Office points of presence. The company is also working to acquire capacity for switched international services to France, Japan and the U.S., and plans to offer videoconferencing services.

Currently, the U.K. only has two full-service carriers, British Telecommunications PLC and Mercury Communications, Ltd. But many observers expect that the government will allow new carriers such as National Network to enter the market after an upcoming review of telecommunications regulations, which is scheduled to begin in November.

National Network is the first organization to take advantage of an amendment made last year to the U.K.'s Branch Systems General License, which permitted resale of leased circuit capacity.

According to Clive Denman, head of communications at the U.K.'s Post Office Information Technology, all the switches are interlinked by lines leased from British Telecom.

"For external subscribers to National Network, we will be pro-

*(continued on page 22)*

## Dos and don'ts for international net managers

**Do**

- know a few words of the local language.
- lower your voice and speak slowly.
- learn some local business customs.
- anticipate different ethics parameters.
- get staff from the local area.

**Don't**

- assume lack of English skills means lack of business savvy.
- expect to change the rules or regulations in another country.
- ignore non-U.S. technology in the country.
- expect all business to be done at the conference table.
- expect so-called international standards to be uniform.

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: ANDERSEN CONSULTING, CHICAGO

# Overseas laws throw kink in bank's net

### U.S. bank hurt by Singapore, W. German rules forbidding int'l transmission of financial data.

**By Walter Sweet**
West Coast Correspondent

SAN FRANCISCO — Bank of America National Trust & Savings Association is spending more than $1 million a year to maintain two data processing centers abroad that it doesn't even want.

Despite having regional DP hubs in Hong Kong and the U.K., the bank is required to operate separate facilities in Singapore and West Germany due to laws within those countries prohibiting the passage of financial data over international networks.

In Singapore, the government has strict laws regarding the secrecy of financial information. These laws prevent the bank from transmitting the data to its processing hub in Hong Kong.

West German laws prohibiting the transmission of financial data into other countries serve as a protectionist measure to keep jobs in the country, according to a bank spokesman. Consequently, the bank has set up a data site in Frankfurt, West Germany.

Both countries' regulations are putting an unnecessary financial burden on the bank, according to Peter Hill, a senior vice-president with Bank of America. The two processing centers could easily be absorbed into existing regional data centers, reducing operational costs, he added.

"In the banking business, the profit margins are reasonably narrow. So any chance we get, we like to push them up," Hill said.

Both sites have IBM 43XX mainframes supporting corporate banking services, loan payments, deposits and applications for credit. These are the same applications used at the bank's data centers in Hong Kong and the U.K. At the regional processing centers, the bank has larger IBM 3090 and IBM 3080 mainframes running those applications.

The Singapore data center employs 12 staffers and costs $500,000 a year to operate, while the Frankfurt center employs 14 workers and costs another $800,000 to run.

**Complicating factors**

The Singapore data center is allowed to send financial results, as well as branch profit and management performance information to the Hong Kong regional center, but it cannot transmit individual customer account balances. It transmits data to the Hong Kong office over a dedicated 256K bit/sec link.

> In Singapore, the government has strict laws on the secrecy of financial information.
>
> ▲▲▲

Government regulations even require the bank to back up the Singapore data center through a government agency that provides disaster recovery service in the event of a catastrophe or power outage.

Hill said Singapore models its banking regulations after Switzerland. Bank of America had similar problems with Switzerland, but eventually, the bank was able to forgo having a separate

*(continued on page 22)*

# My network in marketing won't share

# Now what?

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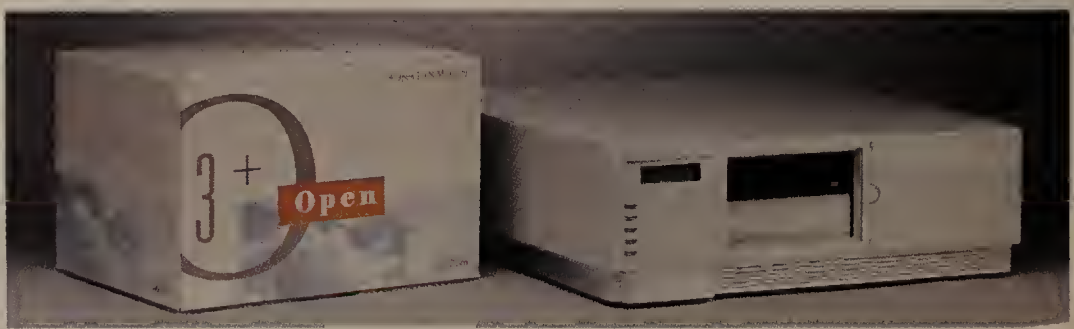

# with the network in manufacturing.

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## U.K. postal service looks to be carrier

*continued from page 19*

viding a complete service, including connections to our network through lines provided by [British Telecom,] Mercury or, where regulations and licenses permit, by the local cable operator,'' Denman said.

National Network's bread and butter is its VoiceCall service, which enables users to send private voice traffic between locations connected to National Network points of presence.

A onetime connection charge of $1,600 and a fixed monthly fee of $273 will be levied for all telephone services, along with usage fees. Switched 64K bit/sec services, called Datacall, will be offered for a $1,230 connection charge and a usage charge of up to $23.28 per 15 minutes.

VideoCall, a two-way voice, video and data service that lets users access two switched 64K bit/sec channels, will be offered at twice the rates of DataCall.

According to Davis, videoconferencing will be a unique service, with National Network supplying the control and switching capability. Neither British Telecom nor Mercury offers this capability today.

The videoconferencing service, currently in its prerelease phase, will be available in July.

If National Network is allowed to compete fully with British Telecom and Mercury, it will likely provide other network offerings, including nationwide private-line services.

## Overseas laws throw kink in bank's net

*continued from page 19*

data center there and shift information to the U.K. data center.

To do this, the bank approached its Swiss customers and received written permission to process their data out of the country. With the customers' approval, the government allowed the bank to process the information out of the country.

But in Singapore, the government will not agree to any such deal because it wants to maintain control of the information and ensure privacy for customers.

The West German government has been somewhat more flexible with Bank of America. The bank still faces the same type of transmission bans as in Singapore, but West Germany allows it to to back up the Frankfurt center through its regional office in the U.K. in case of a catastrophe.

### Relief in sight

Bank of America officials said they expect some relief in Frankfurt next year.

Hill said the West German government has told the bank it will drop the restriction by the end of 1991 and allow the bank to process the data elsewhere. He also said the government is planning to do away with the regulation because it fears protectionism will not fare well in 1992, when the European market opens to foreign competition.

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## Seattle considers building teleport

*continued from page 19*

goods each year. Currently, it has an onsite data network consisting of Wang Laboratories, Inc. VS7310, VS300 and VS100 minicomputers that support a total of 700 to 800 personal computers and dumb terminals throughout the port. The data network is used to track shipments once they have reached the port and is part of an extensive domestic network that tracks the goods for many of its U.S.-based customers.

The port has dial-up and dedicated links to about two dozen railroad, trucking and warehouse firms throughout the U.S. Using the links, customers can determine the location of a given shipment and arrange for a rail service or trucking firm to ship the goods.

> ''We don't know of any other gateway in the area.''

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Patterson said the teleport will not only help the Port of Seattle with its business, but should also be of interest to other users in the region.

''We don't know of any other gateway in the area,'' he said. ''That's one of the reasons we think it's time that we get into the business.''

By sharing the teleport and its costs, the Port of Seattle hopes to lower its operating costs. Patterson said the port will use the teleport for domestic traffic if it is less expensive than the current dial-up and dedicated line system.

The Port of Seattle has commissioned QED Management Services to perform a feasibility study for establishing the teleport in the Puget Sound area of Seattle. The company will survey port customers and the 100 largest companies in the Washington cities of Seattle, Tacoma and Bellevue to see if they would be interested in using the teleport. QED Management will also investigate whether there are any potential partners for the project.

The study should also help the port decide whether it should go with a fiber or satellite link for the EDI connection to Pacific Rim countries. Patterson said AT&T is laying a fiber cable into Seattle Harbor and Pacific Telecom Cable is bringing one into Pacific City, Ore.

# PRODUCTS & SERVICES

THE LATEST OFFERINGS FROM VENDORS AND CARRIERS

## First Look

### Package lets workstations act as Apple net servers

**MT. XINU, Inc.** recently introduced software that lets Digital Equipment Corp., Hewlett-Packard Co. and Sun Microsystems, Inc. workstations act as Apple Computer, Inc. AppleShare file servers.

The software, **K-AShare,** enables AppleShare server functions to operate in background mode on the workstation. With an AppleShare server, the file server must be dedicated to that function.

K-AShare runs on DEC VAXes running Ultrix 3.1 or higher, HP's HP 9000 running HP UX 6.5 or higher, and Sun workstations with Sun OS Version 3.0 or higher. It supports the Apple Filing Protocol, which is Apple's protocol for sharing files among networked Macintoshes.

K-AShare is available now for DEC and Sun workstations. It is scheduled to be available for the HP 9000 in August. Each of the three products costs $995 for one to 15 Macintosh users; $1,595 for 16 to 30 users; $2,395 for 31 to 50 users; $3,595 for 51 to 100 users; and $5,395 for an unlimited number of users.

*MT. XINU, Inc., 2560 Ninth St., Berkeley, Calif. 94710; (415) 644-0146.*

### Digital Link's CSU alerts users of T-1 line problems

**Digital Link Corp.** recently introduced the **Digital Link DL551X-RD,** a T-1 channel service unit (CSU) that can be programmed to monitor and evaluate 12 different T-1 transmission levels.

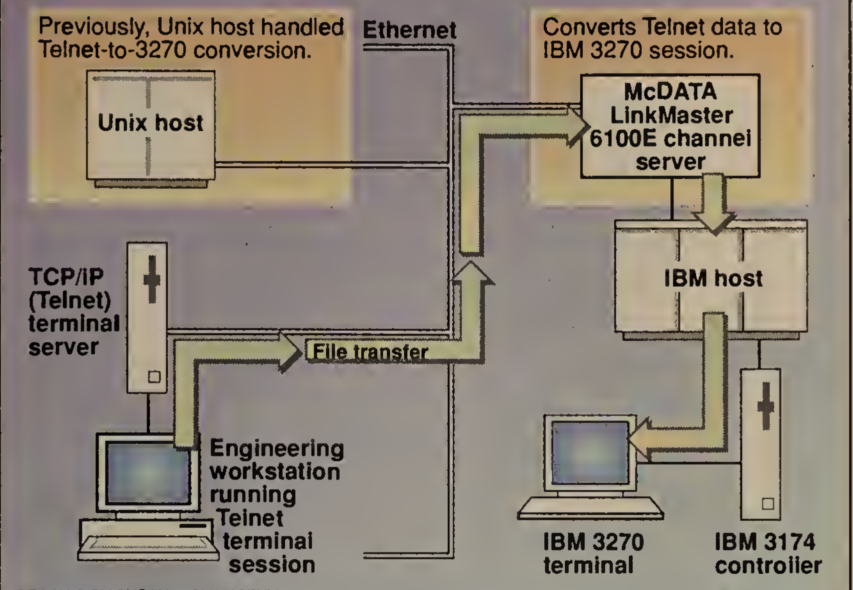
Reports can be printed locally or transmitted to a remote site via a preprogrammed telephone number and modem. The reports show the CSU location, as well as the line creating the alarm.

The product has a communications port so maintenance personnel can monitor network performance. In addition, net managers can change options such as line frame coding and alarm levels.

The DL551X-RD will be available next month for $2,795.

*Digital Link Corp., 252 Humboldt Court, Sunnyvale, Calif. 94089; (408) 745-6200.* ◘

Server handles Telnet-to-3270 conversion


Previously, Unix host handled Telnet-to-3270 conversion.
Ethernet
Converts Telnet data to IBM 3270 session.
Unix host
McDATA LinkMaster 6100E channel server
IBM host
TCP/IP (Telnet) terminal server
File transfer
Engineering workstation running Telnet terminal session
IBM 3270 terminal
IBM 3174 controller

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: MCDATA CORP., BROOMFIELD, COLO.

# McDATA enhances 6100E with support for TCP/IP

### Firm adds Telnet, FTP support to channel server.

BROOMFIELD, Colo. — McDATA Corp. recently added TCP/IP support to its LinkMaster 6100E channel server, enabling workstation users on an Ethernet to access 3270 applications on an IBM host.

Because the 6100E previously did not support Transmission Control Protocol/Internet Protocol software, users attached to Telnet terminal servers had to route 3270 requests through a Unix host that performed TCP/IP-to-3270 protocol conversion.

Until now, the 6100E only supported Digital Equipment Corp.'s Local Area Transport (LAT) protocol, enabling DECnet users attached to DEC LAT servers to set up 3270 sessions directly via the 6100E.

Ethernet users can now add Telnet and File Transfer Protocol (FTP) software to the 6100E.

These protocols enable the channel server to reformat TCP/IP files and data requests into 3270 format and route them to the channel-attached IBM host.

### Support for 3270 sessions

The enhanced 6100E supports as many as 128 concurrent 3270 sessions on up to six Ethernet or DECnet local-area networks.

The addition of TCP/IP support to the 6100E, which already supported 3270 protocols, enables users to free up Unix host memory for the task of application processing.

*(continued on page 44)*

# *HP to offer server version of NewWave for NetWare*

**By Bob Brown**
Senior Editor

PALO ALTO, Calif. — Hewlett-Packard Co. recently said it is developing a version of its NewWave software that will enable users to share objects, such as compound documents and electronic mail messages, across a Novell, Inc. NetWare local-area network.

Unlike previous versions, NewWave 3.0 will enable users to store objects on a network server so that they can be shared with other users on the network, said Jim McDonnell, HP's marketing manager for NewWave. NewWave is HP software used to automate routine tasks and enable applications to work together.

In the initial NewWave 3.0 version, which will ship next month, the software will run stand-alone on each LAN workstation. It will allow users to access data elsewhere on the network as long as they know the network address of the object to which they want to route a request. NewWave already supports this function on Transmission Control Protocol/Internet Protocol, Open Systems Interconnection and LAN Manager/X networks.

A subsequent upgrade, due out early next year, will include a server-based version of NewWave, which will enable users to perform "distributed object management." With this process, NewWave will determine where an object resides and then route

*(continued on page 44)*

# DCA rolls out line of 10BaseT offerings

### Vendor unveils adapter, wiring hub, transceiver that are interoperable with other vendors' gear.

**By Laura DiDio**
Senior Editor

NEW YORK — Digital Communications Associates, Inc.'s (DCA) 10Net Communications business unit recently introduced three products that allow users to support the IEEE 10BaseT draft standard for running Ethernet over unshielded twisted-pair wiring.

The new 10BASE Twisted Pair line consists of an adapter, a wiring concentrator and a transceiver. The products are interoperable with similar 10BaseT offerings from Cabletron Systems, Inc. and SynOptics Communications, Inc., according to Greg Goodall, vice-president and general manager of the 10Net Communications unit.

The 10BASE Twisted Pair Adapter links personal computers to Ethernets supporting unshielded twisted-pair wire. It resides in a slot of a microcomputer based on the Industry Standard Architecture (ISA) bus and features 32K bytes of dual-port buffer memory, which is two to four times the amount of buffer memory available on competing products, according to Ken Davis, 10Net's marketing manager.

"The 32K bytes of dual-port RAM buffer memory increases data throughput and enables the adapter to quickly receive and release data from either the twisted-pair wire or the workstation CPU," Davis said.

Additionally, the 10BASE Twisted Pair Adapter comes equipped with drivers to support a variety of network operating systems including Novell, Inc.'s NetWare 286, Microsoft Corp.'s LAN Manager, and DCA's Secure LAN and Irmalan gateway.

The 10BASE Twisted Pair Adapter is available now and costs $425.

The company also rolled out its 10Base Twisted Pair Concentrator, a wiring hub that supports as many as 10 personal computers linked via twisted-pair, coaxial or fiber-optic media.

The wiring hub can support workstations at a maximum distance of 330 feet in a star topology without the need for repeaters on the twisted-pair wire. Workstations linked via fiber cabling can be supported as far as 9,000 feet from the hub.

Davis noted that 10BASE Twisted Pair Concentrators can also be interconnected to build large enterprisewide networks of 1,000 nodes.

The 10BASE Twisted Pair Concentrator provides the network administrator with diagnostics. The resident network management functions on the concentrator also automatically isolate malfunctioning ports and nodes, and take them off the network so they do not disrupt network operations, Davis said.

The 10BASE Twisted Pair Concentrator will support 10BaseT adapters from Cabletron and SynOptics. The product is available now and is priced at $2,200.

The third offering is the 10BASE Twisted Pair Transceiver. It is equipped with both an RJ-45 twisted-pair port and an attachment unit interface (AUI) port to connect thick- or thin-wire Ethernets to twisted-pair Ethernets through the 10BASE Twisted Pair Concentrator.

> The Twisted Pair Adapter can support a variety of net operating systems.

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Like the other 10BASE offerings, the Twisted Pair Transceiver supports transmission distances of up to 330 feet over twisted-pair media. Through the AUI port, the Twisted Pair Transceiver connects to any IEEE 802.3 Ethernet board that supports the ISA bus or IBM's Micro Channel Architecture bus. The 10BASE Transceiver is shipping now and costs $195.

DCA's 10Net unit also announced that it will unbundle its adapters, transceivers and concentrators and its 10Net network operating system.

Under the new unbundled pricing structure, 10Net software will range from $149 for the Base Pack single-user version to $5,000 for a version that supports as many as 100 users. At the same time, 10Net cut the price of its unbundled network adapters. The 1M bit/sec fiber-optic adapter now costs $595, down from $765, while the 10M bit/sec fiber-optic adapter has been reduced from $1,295 to $795. ◘

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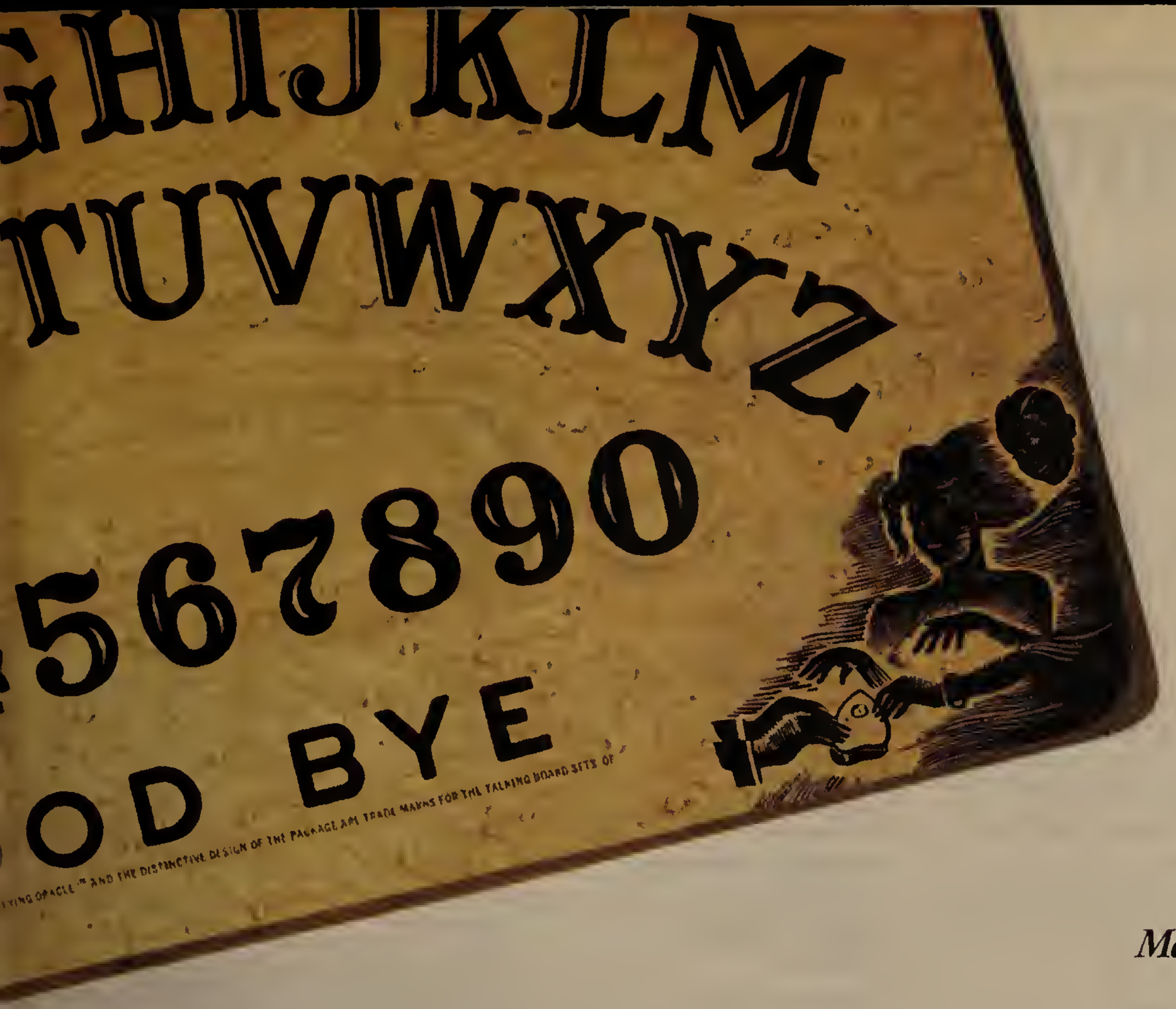

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The foundation to this capability is the new COMSPHERE 4000 Series, an intelligent communications carrier. Using a unique bus architecture, the 4000 Series insures compatibility with existing as well as new products and network services as they are introduced. It also provides the highest configuration density in the market, housing, for example, up to 16 modems and 16 multiplexers.

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# OPINIONS

**NETWORK APPLICATIONS**

BY JAMES KOBIELUS

## The server of a thousand faces reigns supreme

The future of network applications belongs to the server. The traditional paradigm for multiuser applications — terminal networks slaved to all-powerful hosts — is moving closer to extinction.

What distinguishes the server-oriented network from the older paradigm are the twin notions of functional specialization and peer-to-peer communications. The modern network is a menagerie of specialized servers, each labeled according to the on-line resource it makes available. The average network application may require multiple servers.

Ironically, host computers, stripped of many former functions, are being repositioned as high-end file and data base servers. Specialization is the way to go. The economics of information systems may never again favor placing all application processes on a single hub machine.

> The host computing mind-set focuses on factors only a techie could love.
>
> ▲▲▲

### The many definitions

From the user's point of view, a server is any node that controls on-line access to a resource. This is the sense in which the term is most commonly used. Users intuitively grasp the notion of a server because it addresses the particular functions being performed in response to a request for service.

By contrast, the host computing mind-set focuses on factors only a techie could love: size, speed and capacity of the central computers.

However, in an extreme sense, the entire network is the server. All that matters to most users is that something or some things out there are responding in the appropriate way when they press the keys.

For these users, the important distinction is between "front end" — the on-line world as it appears through their workstation interface — and "back end," which encompasses all the unseen technology that exists simply to serve their requests.

Systems engineers look at servers in a more impersonal light. To them, a server is any node that can be called across the network, regardless of what's doing the calling: hardware, software or human being. This definition includes everything that users would regard as a server, as well as some things they would identify as part of the client interface.

For example, it is in the systems engineering sense that we refer to an X Window System terminal as a server. It serves its client — the host — with sophisticated presentation and display capabilities. Likewise, there are local net terminal servers, which are not very different in principle from cluster controllers. Their job is to manage user sessions for the host.

Under remote procedure call (RPC) technology, a server is simply any process that is called by another process. The same process may function as a client or server, depending on the transaction being executed. In a distributed data base, for example, the originating server may process part of a query locally and then behave as a client in its relationship with the remote servers to which it has distributed the remainder of the transaction.

Eventually, server functionality will be built, via RPCs, into most networked systems, including each user workstation. When that happens, the concept of a specialized server machine will become as outdated as the host computing paradigm.

*Kobielus, a contributing editor to* Network World, *is a consultant based in Alexandria, Va.*

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# EDITORIAL

## RBHCs' double standard raises user hackles

The regional Bell holding companies seem to believe in double standards, especially when it comes to U.S. competitiveness.

On one hand, the RBHCs have invested a lot of money to convince regulators, legislators and the public that other nations are investing more in their public networks than we are — part of a calculated public relations effort aimed at winning freedom from current Consent Decree line-of-business restrictions.

But on the other hand, the RBHCs are investing tens of millions of dollars in profits — generated from their monopoly network operations — in foreign network ventures. Certainly, incredible opportunities are taking shape abroad, given the massive political upheavals occurring around the globe.

If the RBHCs are so concerned about declining U.S. competitiveness and a second-rate public network, then why are they targeting their funds abroad? That's a question major U.S. business users, dismayed by the slow pace of network modernization, are raising.

The RBHCs are quick to point out that shareholders, not ratepayers, are footing the bill for foreign ventures. But that's hardly the point.

Shouldn't these RBHC profits earmarked for international projects be plowed back into the public network — particularly at a time when U.S. users are clamoring for greater fiber deployment, Integrated Services Digital Networks, switched data and metropolitan-area network services, new net management tools and a variety of other public network-based technologies?

Given the key role networking has in corporate strategies, it's hard to understand why U.S. users must wait for such technologies while the RBHCs look abroad for opportunity.

The RBHCs' double standard also calls into question whether state and federal regulators should proceed with new regulatory approaches. For example, will the RBHCs use additional profits earned under price caps or incentive-based regulation to improve the public network? Or will they channel them into nonpublic network investments, including international ventures?

Users, regulators and legislators should press the RBHCs on this double standard. They can't have it both ways.

*We'd like to know what you think about this issue. Send a letter to the editor at the address above, call us at (800) 622-1108, fax us at (508) 820-3467 or leave a message on the* Network World *bulletin board. The board can be accessed at 2,400 bit/sec by dialing (508) 620-1160 or (508) 620-1175, or at speeds up to 19.2K bit/sec (V.32) by dialing (508) 620-1178.*

# OPINIONS

## Should BOCs give CO access to alternative local carriers?

### PRO:

By ROYCE HOLLAND

Illinois Bell Telephone Co., as well as the other Bell operating companies, has denied many business customers the option of selecting service from more than one telecommunications provider by refusing cost-based interconnection between its network and alternative local access networks.

Therefore, Metropolitan Fiber Systems, Inc. (MFS) petitioned the federal government to enforce laws that require the BOCs to unbundle access tariffs and allow interconnection. The Federal Communications Commission and the Department of Justice are reviewing these petitions.

Instead of simply agreeing to unbundle their local access charges and permit alternative access providers to collocate equipment in BOC central offices, Illinois Bell is waging a costly battle to keep control of its local access monopoly.

For example, after the Hinsdale, Ill., central office fire, Illinois Bell commissioned a study to determine how to avoid such a disaster in the future. Part of the solution was to provide users with access to alternate routes. But unfortunately, instead of agreeing to interconnect its telecommunications network with alternative local access providers' networks, Illinois Bell's immediate solution was to build its own redundant network — at a cost of $80 million to the ratepayers.

And now, at an even greater cost to Illinois ratepayers, Illinois Bell has announced it will spend $607 million over the next few years to upgrade facilities. Part of that money has been allocated to build a diverse fiber-optic network in the Chicago loop, where alternative local access carriers already provide businesses with diverse fiber-optic network routing.

However, unlike Illinois Bell, which charges all its ratepayers — both residential and business — for its capital costs, the alternative local access carriers build their nets with their own money.

We're pleased that Illinois Bell has finally seen the necessity of offering diverse networks to large businesses. But they are still ignoring one of the major concerns of the business community and Illinois Bell's other ratepayers: Businesses don't

*(continued on page 43)*

*Holland is president and chief executive officer of Metropolitan Fiber Systems, Inc., an alternative local carrier.*

### CON:

By FREDERICK HUGHES

The collocation issue entered the public spotlight recently when Metropolitan Fiber Systems, Inc. (MFS) petitioned the Federal Communications Commission to "establish rules governing the physical interconnection of facilities for competitive carriers providing local access services in interstate communications."

Let's make it clear at the outset: Ameritech favors competition as long as it's full, free and fair. But fair competition entails several requirements. At the very minimum, it must provide: freedom for the local exchange carriers to bring their prices closer to relevant costs; freedom from coercion to offer unbundled network elements below their costs; freedom to eliminate rate subsidies; and freedom to operate in a policy environment where restrictions and regulations would neither favor nor hamper any service provider.

Our objection to MFS' petition is that, couched as a plea for competition, it is in fact an attempt not just to bend the rules, but to *change* them to MFS' own advantage.

Let's look at the arguments one by one.

■ MFS argues that its proposed rules are fair and, if enacted, would foster competition. MFS' notion of fair competition is ironic because the very thing it demands for itself, the company would deny anyone else.

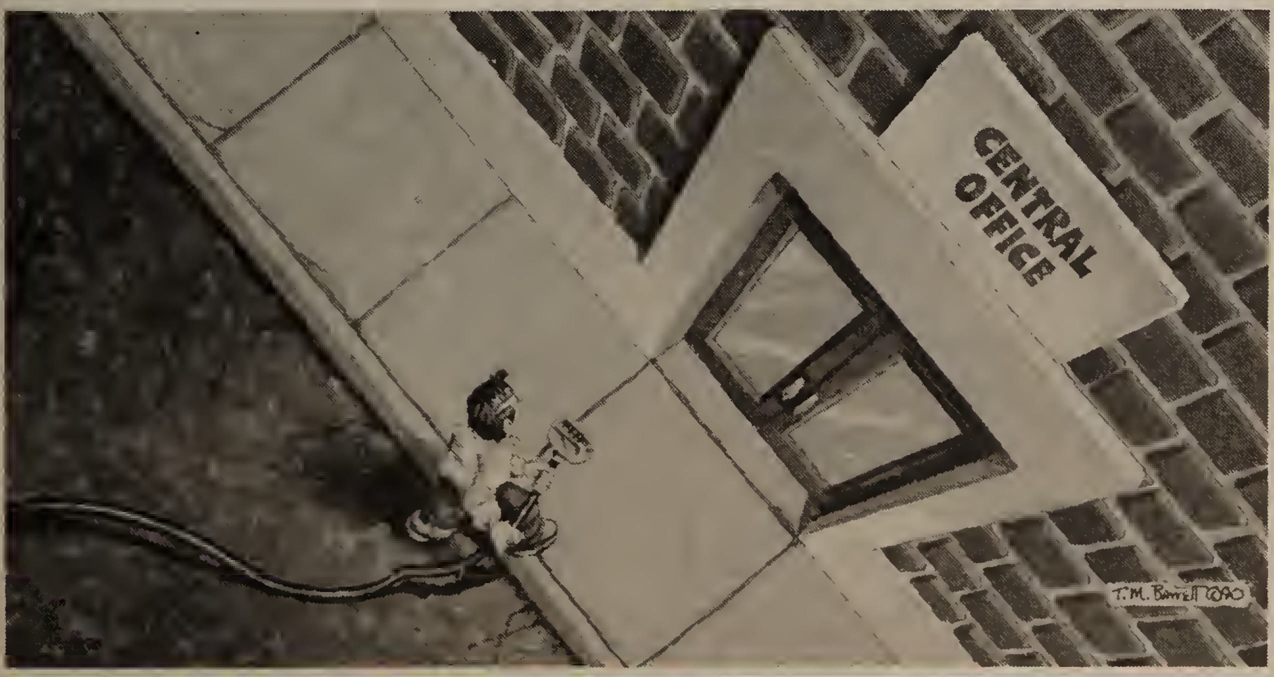
During a Washington, D.C. conference, when asked about MFS' support for physical collocation for other entities such as end users or enhanced service providers, MFS Vice-Chairman Anthony Pompliano said it "wouldn't be appropriate. Network access providers are giving a public service, and there's a decided difference when a large corporate user installs its own facilities and occupies space in a BOC network, thereby precluding anyone else from it."

The MFS petition makes it clear that the company is not as concerned with collocation as with price. MFS alleges in its petition that "although the BOCs generally have not refused interconnection outright, they . . . demand wholly unreasonable and uneconomical prices for competitive access."

Now we see the real beef. Stripped of the rhetoric, MFS is really demanding a special deal — the

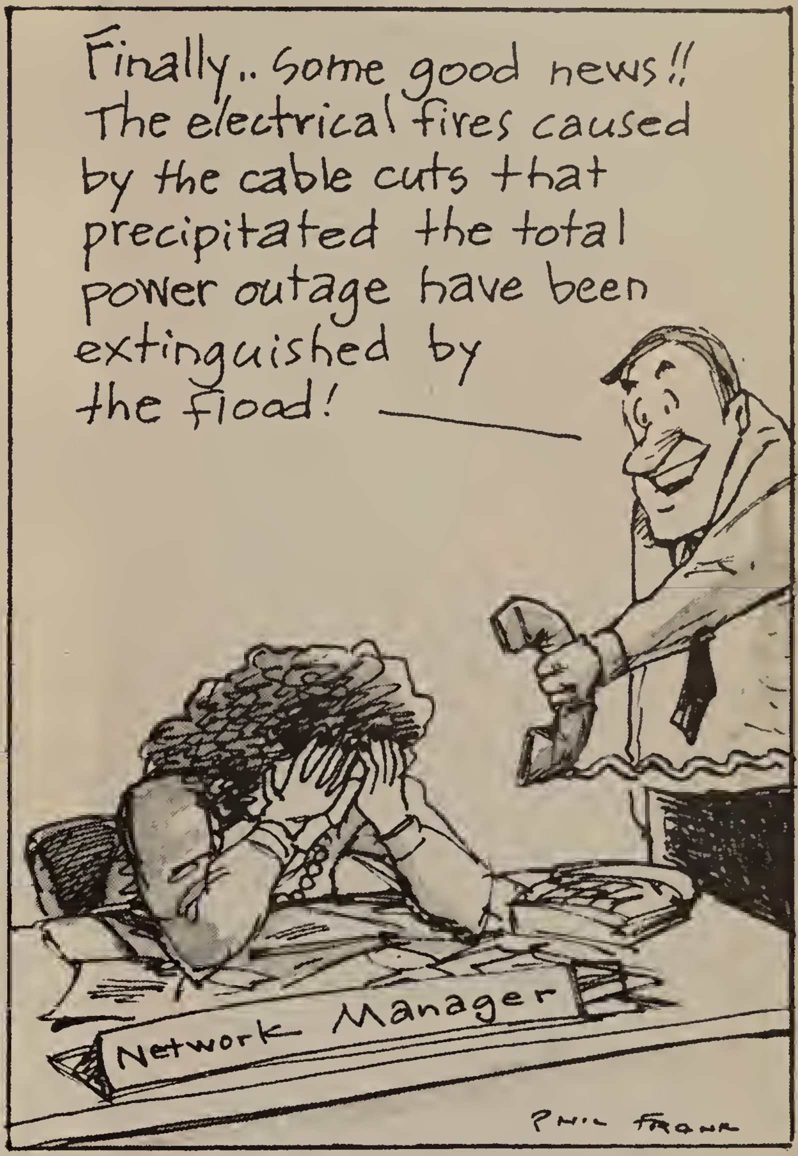
*(continued on page 43)*

*Hughes is vice-president of regulatory support for Ameritech Services, Inc.*



## TELETOONS

BY FRANK AND TROISE


Finally.. Some good news!! The electrical fires caused by the cable cuts that precipitated the total power outage have been extinguished by the flood!
Network Manager
PHIL FRANK

## LETTERS

**Who got punished?**

I'm writing regarding your request for reader comments in the editorial about the sentencing of Robert Morris ("Robert Morris: Does the punishment fit the crime?" *NW,* May 14).

Who got punished? Well, it certainly wasn't Morris. The $10,000 fine to him and his family was a dismally small amount. If he were a ghetto kid, maybe it would have had some impact. However, look at who his dad is. And look at the schools he's attended. Tuition alone at the university he attends considerably exceeds the paltry sum of $10,000.

As to the three months of probation, in the state where I live, individuals who refuse to take a Breathalyzer test are incarcerated, have their driving privileges revoked, are fined and placed on probation for at least one year, in addition to having to do community service work.

This guy did the crime and didn't have to do the time. Justice isn't blind; it can see quite well and hands out justice based on who the individual is.

Guess who did get punished? I *used* to be a member

*(continued on page 35)*

Network World *welcomes letters from its readers.*

*Letters should be typed, double-spaced and sent to Editor,* Network World, *161 Worcester Road, Box 9172, Framingham, Mass. 01701.*

*Letters may be edited for space and clarity.*

**THERE IS NOTHING SO FATIGUING** as the eternal hanging on of an uncompleted task. So write that column for *Network World* today!

Columns should be 600 words in length and submitted on disk, via modem or through MCI Mail at 390-4868.

If you'd like to write a column, call Steve Moore, features editor, at (508) 820-7439 or fax your idea to us at (508) 820-3467.

TELECOM

BUYER'S

GUIDE

**TELEMANAGEMENT AND FACILITIES MANAGEMENT SOFTWARE**

# Telemanaging

CONTINUED FROM PAGE 1

puter-based products exist, but they are most useful for companies with fewer than 200 telephone lines. And packages designed to run over local-area networks are still mostly unknown.

> The latest telemanagement and facilities management packages give administrators greater financial and operational control of their networks.

However, products that run on LANs and personal computers are increasing in capability and functionality, and are starting to present some more serious challenges to the mainframe and minicomputer-based packages, according to Ray Horak, executive vice-president of The Lido Organization, a Mill Valley, Calif.-based consultancy specializing in telemanagement and network management software systems.

## Definitions

Facilities management software packages, which generally include modules to help manage equipment inventory and cabling, frequently come in versions that run on all platforms — personal computers, minicomputers and mainframes.

Telemanagement packages — which often include modules for facilities management but also have modules for call accounting, routing, rating and billing — have traditionally been designed to run on mainframes and minicomputers.

Many use a relational data base to integrate the modules; thus, changing data in one module automatically updates all modules. However, versions that run on personal computers are gaining in popu-

# the network

larity as they become more powerful.

For the purposes of simplicity, both types of software will be referred to throughout this article as "telemanagement software." Comparison information on the two types of products can be found in the charts on pages 32 and 33.

Mainframe-based packages offer users the number-crunching capabilities and report-generation features needed to manage telecommunications nets and to produce monthly billing records for large corporations.

Minicomputer-based telemanagement packages typically provide functionality similar to mainframe packages, but at the departmental level. In most cases, the choice between mainframe and minicomputer software packages is based on established use of the company's computer facilities. As one telecommunications manager says, "You don't buy a mainframe just to run telemanagement software applications."

The distinction between minicomputer- and personal computer- or LAN-based products used to be in the functions each product could perform. For example, personal computer-based products generally offered little more than call accounting.

However, the distinction is fading as more powerful microcomputers with larger storage capacity reach the market and as the telemanagement software developed for these computers gains functionality.

A large part of this increase in functionality stems from vendors' incorporation of off-the-shelf data base management packages into their own products.

"This allows call accounting software [vendors] to concentrate, for example, on call features such as record pricing, leaving the report development partly up to the people that make the data base management products," says Daniel Stusser, president of The Ergotec Group, a telecommunications consulting firm based in Seattle.

## Levels of control

Telemanagement packages give network administrators or managers financial control by allowing them to rate calls, set up least-cost routing of outgoing calls and examine call patterns for abuse or incorrect billing.

The software also helps manage the day-to-day operations by providing useful tools such as an on-line inventory of equipment, directories and, in the case of some packages, a maintenance history of the equipment.

Another function that gives managers greater operational control is the generation of trouble tickets and work orders for moves, adds and changes. Some organizations, including the University of Colorado at Boulder, designed their own telemanagement software system around the writing of work orders (see "Do-it-yourself telemanagement," page 43).

To control planning, the software must be designed to compile statistical information about system usage and maintenance histories of the equipment, which can be formatted into hard-copy reports or data

*(continued on page 32)*

### CHART • GUIDE

On page 32, a *Network World* Buyer's Guide chart compares the features and prices of various telemanagement software and, beginning on page 33, another Buyer's Guide chart compares different facilities management packages.

Now send 10 times more data every second with Digital's Ethernet and FDDI solution.

Ethernet 10 Mb/sec.

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Integrated Image Management graphics generated by SMS.

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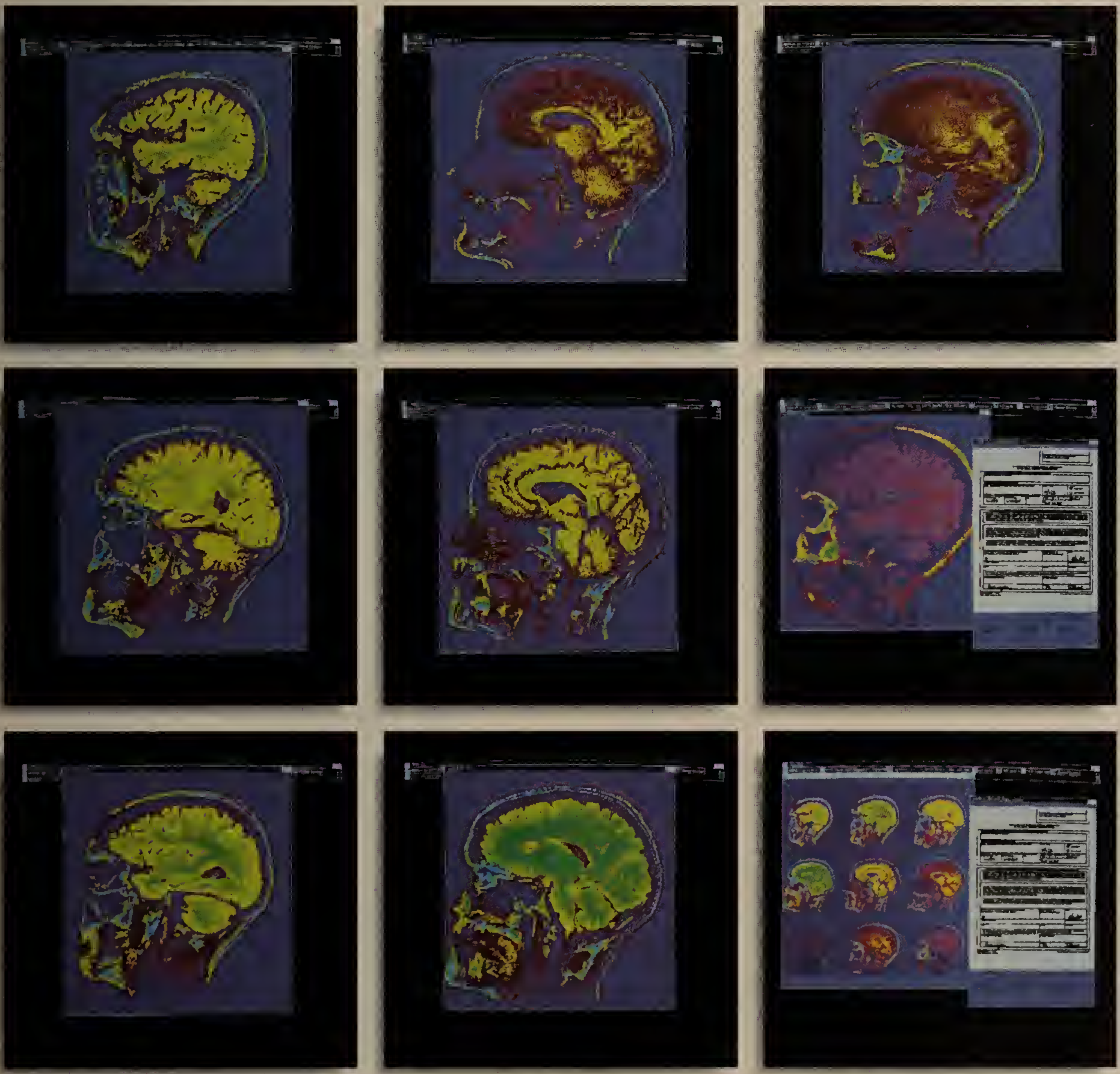

So advanced is all this advanced networking technology that it serves as the foundation for Digital's ground-breaking Network Application Support (NAS), a comprehensive set of software that enables applications integration across a distributed multi-vendor environment. Customers are now able to build network applications using NAS solutions, and be assured of long-term stability and compatibility, even when new technology evolves.

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Digital's Ethernet/FDDI is the intelligent way to send data faster. And DECmcc™ network management software is the intelligent way to manage your Ethernet/FDDI network faster. DECmcc software has built-in intelligence, so it makes short work of long hours of network maintenance. All from any workstation in the network. All with the ease of our DECwindows™ graphic interface.

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**NETWORK WORLD**

## Telemanagement software for mainframes and minicomputers

| Company | Product | Platform | ANI | Least-cost routing | Calls rated | Tariffs | Tariffs from where | How are tariffs updated? | Data base | File formats | Customized reports | Modules | Price | Warranty |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Account-A-Call Corp.**<br>**Burbank, Calif.**<br>**(818) 846-3340** | Telephone Usage Management System 2000 | IBM 43XX, Hewlett-Packard Co. 3000 minicomputers, Digital Equipment Corp. VAX | Yes (if the information is recorded by the PBX) | Yes | V&H, tariffs, cost per minute, cost per call, user-specified or flat rates | 15 service providers, 85 services | From major carriers, through Account-A-Call's service bureau, and from Teletech Services | Floppy or magnetic tape | No; has custom data base system optimized for reporting | Sequential access method | Yes | Data collection polling module; data testing and correction; pricing; reporting module for creation of management, accounting and traffic reports; update module for data base setup and maintenance; bill-back module; raw data query module for on-line data searches | $60,000 license fee (includes one-week customer-site data base setup and training) | 90 days |
| **American Computer and Electronics Corp.**<br>**Gaithersburg, Md.**<br>**(301) 258-9850** | Integrated Telecommunications Management and Reporting System | DEC VAX | Optional | Optional | V&H, telco rate tables or custom rate tables maintained by the customer | AT&T, MCI Communications Corp., US Sprint Communications Co., local telcos | CCMI/ McGraw Hill and collected directly | On-line by downloading or magnetic tape | Yes | Relational DBMS, RMS | Yes | Traffic analysis, alarm processing, call accounting, rate schedule system | $40,000 end-user license fee | 3 months |
| **Cincinnati Bell Information Systems, Inc.**<br>**Cincinnati**<br>**(800) 327-3900** | CMS-3000 Telecommunications Information Management System | IBM or compatible mainframe | No | User can choose type of service routing | Tariff, cost per minute, cost per call, custom pricing options | AT&T, MCI, US Sprint | Valucom subscription service | Magnetic tape, tape cartridge or floppy | No | VSAM | Yes | Call accounting, traffic analysis, equipment inventory, directory | $65,000 license fee | 90 days |
| **Digilog, Inc., a CXR Company**<br>**Montgomeryville, Pa.**<br>**(215) 628-4530** | Administrator | DEC VAX, mainframe (MVS, CICS) | Yes | No | V&H, flat rate, customer pricing | AT&T, MCI, US Sprint, user-defined | Valucom/ Teltech | Floppy disk or magnetic tape | Relational data base-like structure | ISAM, VSAM, RMS | Yes | Call processing, traffic analysis | $9,500 for core program, $15,000 for full package | 1 year |
| **IBM**<br>**White Plains, N.Y.**<br>**(213) 621-6284** | NetView Network Call Accounting | System/370 | Different ANI file formats may require file format translation | Yes, using NetView Voice Network Design | Tariff, percentage of tariff, V&H, cost per minute, cost per call, mileage band, virtual band, incremental pricing, allocation of a fixed amount, surcharge, custom tariff, custom rate table | AT&T, MCI and US Sprint for long distance; International Direct Distance Dialing, WATS, Special Access (Megacom, Prism, UltraWATS), private network tariffs | IBM collects the information | Magnetic tape or tape cartridge | DB2, VSAM | DB2, VSAM | Yes, through interactive screens | Call accounting, traffic reporting, tariff data base, report structures, attendant directory (all included in Network Call Accounting) | Onetime charge of $90,000 or monthly license charge of $1,875 (both prices include maintenance, release updates, and tariff updates) | Central service, including the IBM Support Center, available until discontinued by IBM upon six-months' written notice |
| **The INFO Group**<br>**Framingham, Mass.**<br>**(508) 872-8383** | ATMS Voice/Data Management System | Mainframes, minicomputers | Yes | Yes | Tariff pricing, V&H, cost per minute, custom pricing | AT&T, MCI, US Sprint | Some collected by The Info Group, other pricing from CCMI and Valucom | Floppy, magnetic tape or downloaded | Yes | VSAM | Yes | Call accounting, network analysis, network optimization, inventory, directory, cable and general accounting | $20,000 to $40,000 for MicroVAX, VAX, and mainframe systems | 1 year |
| **Northern Telecom, Inc.**<br>**Nashville**<br>**(615) 737-4000** | Meridian 1 PBX, Applied Computerized Telephony | HP 9000 Series 300, HP 9000 Series 800 and HP 3000 Application processors | Yes | Yes | Tariff pricing | AT&T, MCI, US Sprint and other third parties | Collected by Bell Canada, Inc. | All media: contract service or by user | NA | NA | User may choose from existing screen outputs | Meridian Manager, station administration, work order, traffic report | $2,850 for station administration, $5,000 for work order, $5,000 for traffic report module | 1 year |
| **Stonehouse & Co.**<br>**Dallas**<br>**(214) 770-6909** | MONIES | IBM 370 architecture, IBM 30XX, 3090 and 9370 | No | No | Calls rated according to the trunk they are routed through; user can specify each trunk's rate via tariff rate tables, rate per minute, V&H, cost per minute, cost per call and cutomized pricing options | AT&T, MCI, US Sprint | CCMI | Magnetic tapes | No | MVS, CICS, VSE-CICS | No | Order entry, inventory, cable management, corporate information directory, financial management, availability management, network analysis, profile/help | Starts at $120,000 (site licensing available) | 1 year |
| **Telco Research Corp.**<br>**Nashville**<br>**(815) 329-0031** | CCO System Cost Allocation Manager | IBM mainframe, DEC VAX | No | Yes | Calls identified by trunk group; cost per minute, cost per call, tariff, V&H, user defined options | MCI, AT&T, US Sprint | Tele-Tech, Valucom | Magnetic tape or diskette | No, but supports VSAM or RMS | IBM-VSAM, DEC-RMS | Yes | Call accounting, traffic analysis, inventory management, problem recovery manager, directory services manager, security administration, student resale for telemanagement in college environment | From $22,000 to $84,000 | 1 year |
| **Westinghouse Communications Software, Inc.**<br>**Stamford, Conn.**<br>**(203) 324-0820** | TMS-II | IBM Mainframe MVS/CICS 43XX, 30XX | Yes | Yes | V&H, customer pricing using volume- and distance-sensitive formulas, customers can create unique tariffs | AT&T, MCI, US Sprint, RCI, and all RBOCs, most of the independents, as well as Canadian and International | CCMI | Magnetic tape | VSAM | VSAM | Yes | Directory, traffic analysis, network optimization, message board, what-if analysis | $65,000 | 1 year |

ANI = Automatic number identification
NA = Not applicable
RMS = Record management system
V&H = Vertical & horizontal coordinates

This chart includes a representative selection of vendors in the telemanagement software market. Many vendors not included offer a full range of competitive products.

SOURCE: *NETWORK WORLD*

*(continued from page 29)*

base files for reference use.

Combining this information allows a telecommunications manager to predict when new equipment will be needed. For example, if the incoming phone traffic to the sales department is growing at a fast rate, this information can be used to predict when the phone traffic will exceed the system's capacity.

Also, a net manager who knows a product's maintenance history can easily determine when a piece of equipment is most likely to fail. In both examples, equipment purchases can be planned and budgets can be changed to include such expenditures.

The packages that include relational data base systems allow the net manager to output the information in any format. Some managers may opt to put this information in the form of a data file that can be imported into a spreadsheet program.

The manager can then use statistical analysis techniques on equipment histories and the associated financial information (such as the initial cost of each piece of equipment, the cost to maintain the equipment based on charges for labor and parts recorded in the work order module, and the cost of service contracts) to make projections and perform a what-if analysis in deciding whether to replace old equipment.

Development of telemanage-

*(continued on page 34)*

NETWORK WORLD

## Facilities management (continued on page 34)

| Company | Product | Platform | Cable and wire | Equipment inventory/ management | Trouble tickets | Work orders | Relational data base | Data I/O | Maintenance history | Mean time between failures | Customized reports | Price | Warranty |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **American Computer and Electronics Corp.**<br>**Gaithersburg, Md.**<br>**(301) 258-9850** | Telecommunications Management and Reporting System | Digital Equipment Corp. VAX, Unix System V | Yes | Yes | Selected network alarms based on user-maintained parameters, keyboard entry | Yes | Yes | Flat files | Yes | Optional | Yes | $22,000 for end-user license | 3 months |
| **Autotel Information Systems, Inc.**<br>**Minneapolis**<br>**(800) 328-8966** | Clarity | PC | Yes | Yes | All events entered by system operator | Yes | Yes (Informix) | Delimited ASCII files | Yes | No | No | $2,995 for Clarity call accounting module, $2,000 for cable records module, $2,000 for equipment inventory module, $200 for work order module | 1 year |
| **Cincinnati Bell Information Systems, Inc.**<br>**Cincinnati**<br>**(800) 327-3900** | ICE-9 | Any hardware platform that supports Unix and Oracle Corp. relational data base; AT&T 38 line, DEC, Sun Microsystems, Inc. SPARCstation, NCR Corp. Tower and IBM 386 PC | Yes | Yes | Yes | Yes | Yes | Supports Oracle data base files, data interchange files | Yes | No | Yes, using SQL | $14,000 to $112,750 for required core modules (includes cable and wire administration, service order and switch administration), depending on number of lines; $30,625 to $245,120 for entire package, depending on number of modules and lines | 90 days |
|  | The Communications Management System | IBM mainframe and compatibles | Yes | Yes | Any user-entered event relating to malfunctioning network device or service | Yes, and multiple task orders under work orders | No | VSAM files | Yes | Yes | Yes | $10,000 for Master module; other modules priced from $10,000 to $65,000 | 90 days |
| **CHI/COR Information Management, Inc.**<br>**Chicago**<br>**(312) 454-9670** | Communications Resource Management System | PC or LAN | Yes | Yes | Any user-defined event | Yes | Yes | dBase, Lotus Development Corp. fixed and variable ASCII, data interchange file, MailMerge; also interfaces with call accounting system and CAD systems | Yes | Yes | Yes, user can customize any part of system | Starts at $13,500 for all modules | 3 months, maintenance available on a yearly basis |
| **Data Products International**<br>**Sugar Land, Texas**<br>**(713) 491-7200** | Telco Friendly Software | IBM AS/400 | Yes | Yes | User-definable | Yes | Yes | File formats supported by AS/400 | Yes | Yes | Yes | Starts at $27,000 | 60 days |
| **DATAP Systems, a Division of Sandwell, Inc.**<br>**Atlanta**<br>**(404) 433-9450** | Intelligent Real-Time Information System 7000 | VAX | Yes | Yes | Issued for any activities in the system | No | Yes, in Idea module | Yes, runs on the Habitat data base | Yes | Not as a standard; user-built application | Yes, on any parameters in the system | Depends on DEC CPU selected, starting price is $25,000 for a VAXStation-based system | Standard project warranty is 1 year from date of installation, license purchase comes with 90-day warranty |
| **Digilog, Inc., a CXR Company**<br>**Montgomeryville, Pa.**<br>**(215) 628-4530** | Administrator | PC, VAX, mainframe (MVS/CICS) | Yes | Yes | Operator-driven | Yes | Relational-like structure based on a fourth-generation language | Yes, Oracle, Ingres, SQL, DB2 | Yes | Yes | Yes | Starting price for core program: $19,000; full package: $25,000 | 1 year |
| **IBM**<br>**White Plains, N.Y.**<br>**(213) 621-6284** | NetView Voice Facilities Management | System/370 | Yes | Yes | Any event using the interactive trouble ticket or from an event sent to NetView (using NetView automation facilities) | Yes, for voice and workstation equipment | DB2 Version 2.1 or later | Any file using sequential format | Yes | Yes | Yes | Onetime charge of $190,000 or monthly license charge of $3,960 (either pricing option includes maintenance and release updates) | Central service, including the IBM Support Center, available until discontinued by IBM upon six-months' written notice |
| **The INFO Group**<br>**Framingham, Mass.**<br>**(508) 872-8383** | ATMS Voice/Data Management System | PC, LAN, MicroVAX, VAX, IBM 9370, mainframes | Yes | Yes | PBX and trunk alarms | Yes | Yes | ASCII | Yes | Yes | Yes | Modular pricing ranges by platform: $50,000 to $100,000 for PC/LAN; $100,000 to $150,000 for MicroVax, VAX and 9390; $150,000 to $200,000 for mainframe | 1 year |
| **ISICAD, Inc.**<br>**Anaheim, Calif.**<br>**(714) 533-8642** | COMMAND 2000 | IBM PCs and compatibles | Yes | Yes | User-definable events | Yes | Yes | ASCII | Yes | Yes | Yes | $12,950 | 90 days |
| **Quintrel Corp.**<br>**Cedar Rapids, Iowa**<br>**(319) 363-5508** | CableTrak | PC; IBM PS/2, RISC System/6000, RT; AT&T 3B2 | Yes | Yes | Equipment failure, switch problems, weather-related problems, wiring facilities trouble, problems detected by company's line test module | Yes | Yes | ASCII | Yes | Yes | Yes, user-defined fields and codes, free-form comment capabilities, query functions | Modular system, pricing starts at $5,000 | 1 year |
| **Stonehouse and Co.**<br>**Dallas**<br>**(214) 960-1566** | Moines | Mainframe and minicomputers | Yes | Yes | Yes | Yes | No | No | Yes | Yes | No | Starts at $120,000 | 1 year |
| **Sykes Datronics, Inc.**<br>**Rochester, N.Y.**<br>**(800) 336-6867** | COMM-NET 2000 | Unix/Xenix operating system-based 386 platform | Yes | Yes | All reported failures | Yes | Yes, Unify system | No | Yes | Yes | No | Modular system, pricing starts at $995 | 1 year application support included in price |

This chart includes a representative selection of vendors in the facilities management software market. Many vendors not included offer a full range of competitive products.

SOURCE: NETWORK WORLD

NETWORK WORLD

## Facilities management (continued from page 33)

| Company | Product | Platform | Cable and wire | Equipment inventory/ management | Trouble tickets | Work orders | Relational data base | Data I/O | Maintenance history | Mean time between failures | Customized reports | Price | Warranty |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Telco Research Corp.**<br>**Nashville**<br>**(615) 329-0031** | CCO System Telecom Operations Manager | IBM mainframe, VAX | Yes | Yes | User-defined for any type of event | Yes | No, but uses relational-type structures (VSAM, RMS depending on platform) | VSAM, RMS | Yes | No | Yes | $35,000 to $98,000 | 1 year |
| **Xiox Corp.**<br>**Burlingame, Calif.**<br>**(415) 375-8188** | Xiox Facilities Management Series | PC | Yes | Yes | Console alarms, crosstalk, line disconnect, no dial tone, noise on line, bad cabling, bad PBX, power spike | Yes | Yes | dBase, Lotus, ASCII | Yes | Yes | Yes, through filters | $4,500 | 90 days |
| **Westinghouse Communications Software, Inc.**<br>**Stamford, Conn.**<br>**(203) 324-0820** | CMS-I | SPARCstation (Unix-based OS), IBM mainframe 43XX, 30XX | Yes | Yes | All nonreal-time voice-related troubles | Work orders automated to perform all moves, adds and changes | Yes, VSAM | Any system accepting flat file format | Yes | Yes | Yes | $50,000 for Unix-based; $65,000 to $240,000 for others | 1 year |

This chart includes a representative selection of vendors in the facilities management software market. Many vendors not included offer a full range of competitive products.

SOURCE: *NETWORK WORLD*

*(continued from page 32)*

ment and facilities management tools for telecommunications systems has lagged behind the data communications counterpart. This is largely because before the divestiture of AT&T, most users had little need for the fully featured telemanagement products that are available today.

The data side of the communications industry, on the other hand, historically has had more sophisticated tools to handle facilities, according to Randall Manuel, president of Telecommunications Software, Inc. in Westbury, N.Y. "Data communications management has been around for a longer time, so they have a huge head start," Manuel says.

> "Users want a fully integrated system. There are, however, very few available," Horak says.

▲▲▲

John Dretler, president of The Info Group, a telemanagement software vendor in Framingham, Mass., seconds Manuel's opinion. "Data communications network management systems have led the telemanagement systems," Dretler explains. "But telemanagement has been catching up ever since divestiture."

Ironically, one factor driving telemanagement software makers to produce products with more utilities is that telecommunications departments are increasingly being managed by people with data communications backgrounds. Managers from the data communications camp, who are accustomed to being able to control their data networks with utility programs, want the same level of control over the telecommunications systems.

"As data communications people move into telecommunications, you are going to see more and more of the telecommunications system utilities being developed faster," Manuel says.

### Levels of integration

Ideally, users of telemanagement and facilities management software want to be able to update and integrate all information simultaneously using one package. "Users want a fully integrated system," says The Lido Organization's Horak. "There are, however, very few available."

There are varying degrees of integration in facilities management software. The most integrated programs offer relational data bases that provide what is called a "single point of entry," or the ability to update data across all modules with one entry.

As an example, consider the task of adding a new telephone extension in an office. First, an extension number is assigned and entered into the software package. In addition to entering an extension, the physical location is entered and a work order is issued.

If the program has a relational data base, many records will be updated simultaneously. For instance, one phone will be subtracted from the inventory records and the directory will be changed to include the new extension. Additionally, the cable management data base will be updated.

State College-based Pennsylvania State University, which runs Telecommunications Software's telemanagement software on a LAN (see "Telemanagement on LANs, this page), developed its own integrated trouble ticket system using Microrim, Inc.'s

*(continued on page 35)*

## Telemanagement on LANs

Pennsylvania State University's telecommunications department runs its telemanagement software on a local-area network. Before using the LAN-based system, the State College-based university used a combination of machines, including minicomputers and mainframe hosts.

"Two and a half years ago, when we were doing telemanagement partly on a minicomputer and partly on a mainframe host, we started to look for a new telemanagement system," explains Jeff Kuhns, Penn State's director of voice services and administrative support. "We were going to be installing a LAN regardless; it made sense economically to combine the functions of the LAN with the telemanagement system.

"The advantages to telemanagement on the LAN are better access to data, better control and immediate access to files, as well as access to the program to make changes as they are needed," Kuhns says.

"Using the previous system, we'd drop off a tape and it would take a couple of days to process a job," he says. The LAN-based system gives the Penn State telecommunications staff instant access to the records stored on a server.

"We are maintaining cable records and switch port configurations for 22 locations all on the one LAN," Kuhns adds. The system processes roughly a million billable minutes per month and works with hundreds of thousands of records per month. In addition, the system handles about 150 work orders per month.

The LAN-based system uses a software package developed by Telecommunications Software, Inc., a Dallas-based software house. The system runs multiple functions on the LAN, including administrative billing of call records and student resale. Student resale is a term in telephone billing that means billing students for phone services that the school administers, such as in dormitories.

In a sense, the school is the local telephone company; the students buy their phone service from the school. The telemanagement software package keeps track of the calls and produces a bill at the end of the month. Everyone in the telecommunications department has access to the shared data that sits on a file server.

Routine telemanagement work done on the LAN includes updates to the data base for call rating and billing. "There are master files that need to be maintained on a day-by-day basis, and once a month, we run a billing procedure for three different billing systems," says Greg Ritchey, senior systems analyst at Penn State. One run takes seven hours and is done overnight.

At the end of the month, the system takes the calls that have been formatted and rated, and sets up the reports and invoices that need to be produced. Because LANs are not practical for the printing of the invoices and bills that go to students, the records are sent to a mainframe, where the printing is done on a laser printer.

Penn State is in the process of adding cable facilities management and inventory management to the system. "We already have a trouble ticket system that was developed in-house, which is written in R:base," Ritchey says.

"We are trying to take a fairly comprehensive approach to telemanagement to match the comprehensive services we provide," Kuhns says. For example, billing for video uplink use will be maintained on the same LAN. In addition, the system already manages many different private branch exchanges, including a DMS-100 voice switch as well as the university's data circuit switch and high-speed packet-switched network.

### A helping hand

The LAN-based telemanagement system has been a tremendous help to Penn State's telecommunications staff.

"We could not be doing what we are doing today with our old method," Kuhns explains. "We feel we made the right decision to use the LAN approach."

Ritchey agrees, adding, "We are convinced that using LANs or PCs is the way to go for any project like this. It has just been incredibly easy to administer, to work on and to debug when fixing problems. Besides, it's cheap to expand compared to mainframes."

Another advantage to LAN- and personal computer-based telemanagement systems is that the user can use spreadsheet or fourth-generation language software to easily produce customized reports rather than wait for data processing support, as was the case with minicomputer- and mainframe-based systems.

Even with all of these advantages, Kuhns sounds a cautionary note to those who may pursue this path.

"We have learned that telemanagement systems are never implemented as quickly as you think they will be and that they are never as easy to bring up as you think they will be. However, we are still convinced that they are essential and that integration of the functions is essential."

— *Salvatore Salamone*

## Telemanaging the network

*continued from page 34*

R:Base, a relational data base that allows integration of several telemanagement functions.

"Our goal is to have everything integrated into a one-system approach," says Jeff Kuhns, director of voice services and administrative support at the university. "By the end of the summer, we will have virtually all of our staff, whether they are technician level, engineer level or management level, operating on the system.

"One work order will update everything, with one exception," Kuhns explains. "We will not be directly updating any switch that we are maintaining records for. We will be able to write a work order to change ports on a data switch or on a central voice switch. However, that work order will not automatically reconfigure the switch."

At Massachusetts Financial Services Co., a Boston-based financial institution, integration of telemanagement functions has improved operations.

The company uses The Info Group's Automated Telemanagement System (ATMS) Voice Data Management System to track and allocate costs of all incoming and outgoing calls, as well as to maintain equipment inventory information and provide a corporate directory, which is automatically updated when a work order is issued.

Mass Financial, which handles about 250,000 call records per month, claims to be able to process work orders for moves, adds and changes in less than 24 hours using the ATMS product.

> "Our goal is to have everything integrated into a one-system approach," Kuhns says.
>
> ▲▲▲

Using telemanagement software to reconfigure the switch or private branch exchange represents a higher level of integration.

"The key issue is whether a software package provides for a two-way interface with the switch," The Lido Organization's Horak says. "Every [vendor] will say [their software package] can read records off PBXs. But can it send information to the switch, or do you have to go over and reconfigure it?" He adds that, in many cases, software firms and PBX makers are entering into agreements whereby the PBX manufacturer gives the telemanagement software vendor access to proprietary software programs that control the switch.

*(continued on page 43)*

## Letters

*continued from page 27*

of a network that was connected with Internet, in which Morris unleashed his worm. However, the public utility where I work discontinued access to this network because of the possible harm that the likes of Robert Morris can perpetrate.

Name withheld by request

### Assessing the damage

The author of your editorial "Robert Morris: Does the punishment fit the crime?" (*NW*, May 14) seemed distressed because Morris was not ordered to pay restitution to Internet users.

While it is certainly true that Morris' program was the direct cause of Internet damage, ordering him to pay restitution would essentially negate the fact that Morris simply exploited security lapses that were intentionally placed in Berkeley Software Distribution Unix.

Current trends in the law lean toward seeking restitution from those with the deepest pockets. In the Morris case, this would be the University of California at Berkeley for licensing the code, AT&T for requiring a license from users in order to use the Berkeley code (essentially a level of warranty) and possibly even Cornell University since Morris was being paid by the university as a graduate student.

In addition, assessing the damage caused to the Internet is difficult. Estimates of how many hours were required to clean up after the worm vary so wildly that any litigation concerning damages would last well into the next century.

And, of course, the question would be asked why some machines were affected and others were not. It will be significant that some system administrators closed the security holes and were not affected, while others did not and were infected.

It is far too easy to point fingers at Morris for Internet damage. While it is indeed true that he unleashed a worm on the Internet that harmed many people, we must not lose sight of the fact that determining "who should pay for it" is an extremely difficult task.

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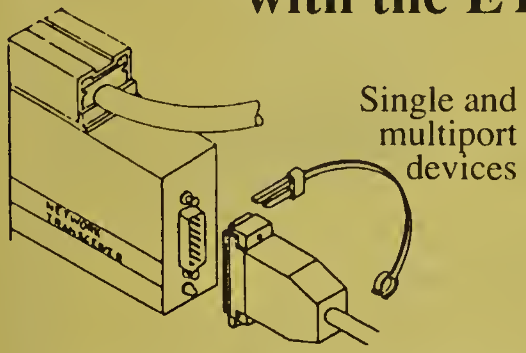

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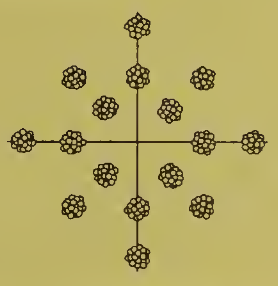

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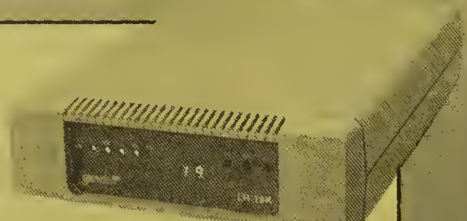

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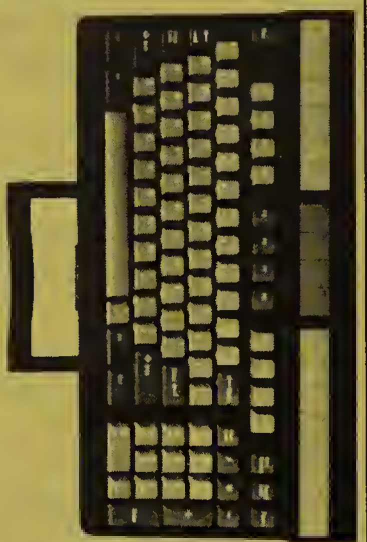

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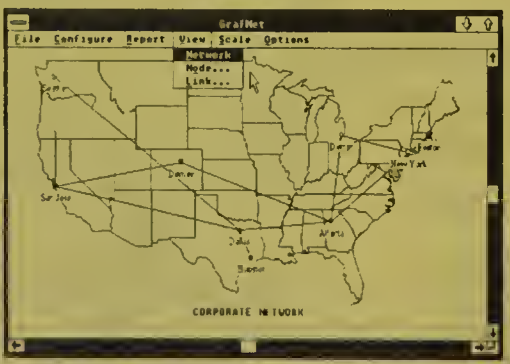

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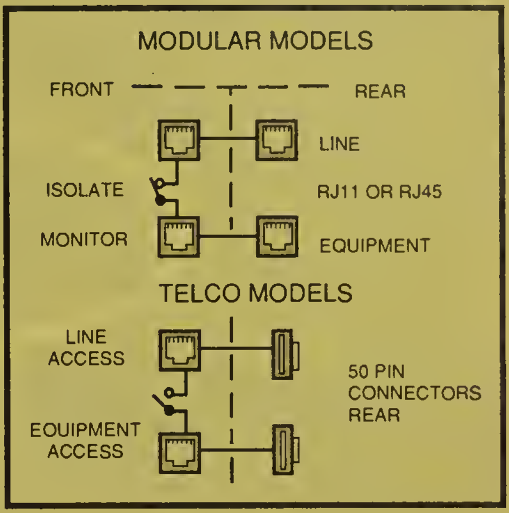

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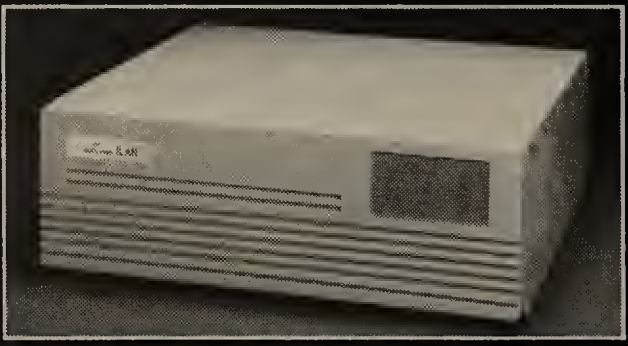

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# Do-it-yourself telemanagement

When the University of Colorado at Boulder was about to discontinue its Centrex service five years ago, the university's telecommunications staff began to look at telemanagement software to support the institution's needs.

Familiar with the difficulties of developing software applications in-house, the school was very much interested in buying an off-the-shelf package.

Because of his background as a systems analyst, Dennis Maloney, the university's assistant director of telecommunications, was asked to define system requirements and select a package for the school. In the spring of 1985, the university used those requirements to create a request for proposal and sent it out to more than 15 vendors.

A new switch was to be cut over in August 1986, giving the college a little more than a year to install a software package and make whatever modifications were needed to support the institution's specific needs.

"When we looked at the packages at that time, there were three or four that seemed appropriate," Maloney says. "But they were only meeting 60% to 65% of what we felt our requirements were."

Jeff Lipton, director of office support systems at the university, decided to develop an inhouse alternative. The college's administrative computing department was asked to estimate how much it would cost to develop a telemanagement program, and Maloney looked into the costs of hiring programmers to write the code.

"We took both estimates and determined we could get more functionality and more closely meet the needs of the telecommunications department if we did it ourselves," Maloney says. "We felt that we had enough time to write the code.

"One of the things that worked well for us was that the people working in the department had a good feeling for what they wanted from the system," he says. "They were very strong in helping design the system. It wasn't as if a systems analyst looking in from the outside did the design. The analyst was right in the middle of the department doing the design."

The code was written by a group of programmers. One worked for four months, another for two months, and a part-time programmer worked for about two months. Together with Maloney, they wrote all of the code for the system in Info/Basic, which is a version of Basic that runs on Prime Computer, Inc. minicomputers.

The major component of the system is the work-order process, which updates inventory and billing records in addition to scheduling moves, adds and changes based on the work orders issued. Included in the inventory records are equipment and cable records.

The system also has billing and pricing modules, and it rebills for both administrative and student usage. Creating the student resale process was fairly intensive, Maloney says. Student resale is a term in telephone billing that means billing students for phone services — as in dorms — that the school administers. In a sense, the school is the local telephone company; the students buy their phone service from the school. The telemanagement software package keeps track of the calls and produces a bill at the end of the month.

The system also provides the university's console operators with an on-line directory.

All of the modules are integrated. "When we get a request to move a phone, we write a work order," Maloney explains. This step — entering the work order on the telemanagement system — generates the paper work, schedules the hours and assigns cable pairs. The entry for a request to move a phone also updates the billing records when the work order is closed.

Creating the work order on the telemanagement system automatically updates the information in many modules. For example, if a work order is generated to install a new phone, the equipment inventory module changes the records to reflect the addition of the phone. Also, the cable management module is updated to include the cabling assigned to that phone. The directory module is revised so the new extension is available to the university's telephone operators using the on-line phone directory.

The University of Colorado's telemanagement system processes about 10,000 work orders per year, with the heaviest months being from August through October. The system supports about 10,000 phones and student resale for about 6,000 students.

The do-it-yourself telemanagement system has been up and running for four years this month, leading Maloney to say, "I would do it again. I think we took the right approach."

*— Salvatore Salamone*

# Telemanaging the network

*continued from page 35*

The primary advantage to such fully integrated packages is that it eliminates multiple entries of information into the data base. In many cases, this means that a telecommunications department can operate with fewer people.

Obviously, fewer people means a lower payroll and financial savings. But perhaps more importantly, this reduction could help solve the growing problem cited by network managers of finding qualified staff for their networks.

User demand for systems that update the switch from commands issued in the telemanagement and facilities management software has led to partnering agreements between software firms and switch manufacturers.

Telemanagement systems have multiple data bases that are broader in scope than the more limited data bases associated with the switch itself. They contain information on the phone systems related to the PBXs, which means there is some redundancy.

"Without the partnering agreements, there are two data bases: one with the switch, another with the telemanagement system," says The Info Group's Dretler.

But that isn't the best solution, Telecommunications Software's Manuel says. "What you want is a system that interfaces to the switch and that independently updates the switch based on a work order completion, as it does with the [telemanagement and facilities management] data bases associated with the work order," he says.

Overcoming the technical hurdles to integration of telemanagement tools and switches may not be the only obstacle to acceptance.

"We have talked about switch integration for the past year," says Greg Ritchey, senior systems analyst at Penn State. "I think it is technically possible, but whether we feel it will be economically practical is another story."

# Pro

*continued from page 27*

just need diverse routing and redundant network equipment; they need the opportunity to use more than one local telecommunications provider to ensure that their networks are safe.

Also, ratepayers throughout the state shouldn't have to pay for service that is available to and needed only by select customers. Some Illinois Bell ratepayers still use party lines and don't even have basic modern technology such as digital switching service.

In fact, all the BOCs — Illinois Bell included — have been charged with the serious task of managing the nation's local telecommunications systems to serve the public's interest. Yet they don't appear to be acting in the public's best interest.

Illinois Bell could easily safeguard against future Hinsdale-like disasters, at a reasonable cost to ratepayers, if it would simply work with alternative local access carriers.

Instead, the BOCs are using scare tactics and false accusations in an attempt to dissuade public support for local equal access.

**BOCs backed into a corner?**

As soon as MFS began suggesting that alternative local carriers be allowed cost-based interconnection of their networks with BOC networks, the BOCs began howling that such competition would leave them with stranded investments and force them to raise rates. Of course, they had no concrete evidence to substantiate these claims, but they made them just the same.

If the BOCs allow interconnection, those customers that need secure, redundant telecommunications could use alternative carriers' diverse networks. And only those companies using the service, and not all ratepayers, would pay for it.

Local equal access is a simple, cost-effective means to ensure that the needs of all customers are met.

But the BOCs don't consider local equal access as an opportunity to provide ratepayers with a cost-effective solution to secure local telecommunications.

Instead, they have launched a $21 million lobbying effort to prevent competition in the local access market while allowing them to seek greater regulatory freedom and pursue other interests outside of providing local telephone service, such as equipment manufacturing and information services provision.

The BOCs don't want to jeopardize the guaranteed profits ensured by their monopolies on local phone service. Instead of risking their own capital to upgrade their facilities, as companies in competitive markets are forced to do, the BOCs can merely raise rates to cover expenses because ratepayers have no other choice for their local phone service.

Providing ratepayers with access to alternative networks as a method of preventing another Hinsdale would force the BOCs to admit that other companies can and do provide local telephone service. And if ratepayers find that out, they may want to use more service from alternative local carriers.

# Con

*continued from page 27*

right for alternate local access carriers to obtain exclusive, wholesale interconnection rates so that they can compete *fairly* in the local access marketplace. But this special deal they propose is not only egregious, it's unlawful.

**The right to collocate**

MFS says it deserves the right to collocate in local exchange company buildings. It claims that Section 201(a) of the Communications Act of 1934 requires collocation as a form of interconnection.

But in the 55 years this legislation has been in effect, no court or regulatory body has ever found such a requirement within the intent of the act.

What's more, no court or regulatory body has found that physical collocation is required for competitive reasons. In fact, in approving the Modified Final Judgment, the Washington, D.C. District Court expressly rejected collocation arguments.

Furthermore, MFS itself acknowledges in its petition that the BOCs today provide exactly what the Communications Act requires — "access to their networks on reasonable and nondiscriminatory terms."

- MFS also claims that its petition is in the public interest, but it isn't. It ignores the FCC's mandate under the Communications Act, which is to make available to *all* the people of the U.S. a rapid, efficient, nationwide communications service with adequate facilities at reasonable charges.

Under this mandate, the FCC has long pursued its pro-competition agenda in ways that are not detrimental to other public policy goals.

- MFS conveniently ignores the FCC's efforts. MFS' idea of competition, for example, comes at the expense of the FCC's goal to eliminate unreasonable discrimination and undue preference among rates for interstate services. The company's proposed rules also ignore the potential impact on the states' policy agendas.

When you take off the rhetorical makeup, the MFS petition is really a rate complaint — an attack on tariffed access services offered by the BOCs pursuant to the FCC's existing access charge policies.

What MFS really wants is a less expensive rate, even if it means that their rate is different from what telephone companies charge everyone else for the same service.

Ameritech's view is that MFS' petition for rule making would neither benefit the public nor competition. It would benefit only MFS by creating a regulatory niche designed to ensure its prosperity.

## Madge Networks recalls adapters

*continued from page 4*

conductors used in the product, and the two companies are now working together to solve the problem.

**Falcon chip at fault?**

Madge attributed the problem to "an unknown shortcoming" in TI's Falcon chip, one of two chips in the TI 16M bit/sec token-ring chipset.

Leon Adams, TI's open systems marketing manager in charge of LAN products, confirmed that Madge Networks and TI are at work on a solution but denied that the adapter problem is attributable to any flaw in the Falcon chip.

Adams noted that TI's Falcon and associated Eagle chip will be used by all suppliers of the dual-speed 4M/16M bit/sec token-ring adapters with the exception of IBM. Proteon currently uses its own chips but plans to convert to the TI chips in the next several months.

IBM, which has sold more than 95% of all the 4M/16M bit/sec token-ring adapters shipped to date, has not experienced any problem because it uses its own chipset. IBM currently has a six-week order backlog for adapters, according to John McElroy, IBM's director of LANs in the Communication Systems unit.

So far, Madge Networks is the only third-party token-ring vendor that has reported a problem, Adams said.

"There is no inherent problem in the design; the Falcon 38053 chip meets all of the IEEE 802.5 data specifications," he said.

Token-ring adapters, Adams noted, are system-level products, and while adapter performance does depend on the chips, many other factors influence an adapter's functionality, including on-board passive components, circuit board layout and other devices on the LAN such as the multistation access unit.

"It's up to the individual adapter vendors to test their boards," Adams said. "But as a result of this issue, Texas Instruments will now start to do its own in-house testing in a networked environment."

Adams acknowledged that the Falcon and Eagle chips are sensitive to other board components and that problems could arise with various vendors' implementations of the chips.

"Ideally, our Falcon chip would be so insensitive to its surroundings that it could make anything work, but the reality is we're not there yet," Adams said.

Madge said he did not know when his company will resume 4M/16M bit/sec token-ring adapter shipments.

## Adapter makers queue up for TI chipsets

DALLAS — Texas Instruments, Inc. said last week it will ship volume quantities of its 4M/16M bit/sec token-ring chipsets by fall, a move that will lead to greater availability of dual-speed token-ring adapters.

TI's chipset is used by almost all token-ring adapter vendors with the exception of IBM and Proteon, Inc., which currently make all their own components.

Token-ring adapter suppliers such as Proteon, Western Digital Corp. and Gateway Communications, Inc. say there is pent-up demand for 4M/16M bit/sec adapters. That's because TI's chipset production has been limited to a trickle due to production problems, according to Leon Adams, TI's open systems marketing manager in charge of LAN products ("Chip scarcity may affect LAN adapter," *NW*, Jan. 15).

"We've had problems getting a high percentage of the chips to meet all of the IEEE 802.5 data sheet specifications," Adams said. "But we've overcome that and anticipate full-volume production by the third quarter 1990."

TI will be hard-pressed to satisfy demand for the chipset even at full-volume production. Adams declined to divulge what TI's monthly run rate will be but noted that demand is strong.

"We have over a three-month order backlog for the chipset," Adams said.

Adapter vendors said TI's order backlog for chips is indicative of the order backlog for network interfaces.

Proteon engineered its own chip last year as a stopgap measure to fulfill user demand for the 4M/16M bit/sec token-ring adapters, but it will switch to TI's chips as they become available, according to company President Patrick Courtin. He said Proteon's decision to buy the chips from TI rather than to continue to produce its own was for economic reasons, as well as a desire to use the industry's standard chipset.

In the past nine months, Proteon has shipped more than 16,000 of the dual-speed adapters that contain its own proprietary chipset. Courtin said Proteon could have easily sold 10 times that amount if the TI chipset was available. "I'll take all the chips I can get from TI," he said.

— *Laura DiDio*

## N.E. Tel pays out millions

*continued from page 2*

The spokesman declined to say how long the flawed billing software had been used or why only some of the customers served by the central office were charged two message units for each single message unit call. Nor would he divulge the exact amount of overbilling that resulted from the problem.

**Catching the glitch**

Len Evenchik, telecommunications director for the Commonwealth of Massachusetts, was the first to discover the problem. "After a reorganization of our [communications group], we began a network analysis and review," he said. "The numbers we came up with didn't match New England Telephone's bills, which were about $100,000 a month too high.

"Working with New England Telephone, we identified a billing problem regarding message units," Evenchik said. "We worked with [New England Telephone] to ascertain when the problem started and its impact on our billing over the years.

"We worked very hard with them to resolve the issue and received a $6 million credit to our account extending back over several years," Evenchik said. The state and New England Telephone are in the midst of a "joint network audit and systems review," he added.

**No recurrence**

After correcting the problem and issuing credits to affected customers, New England Telephone conducted an extensive review of the billing software used in each central office in its five-state region, the spokesman said. "There were no recurrences of the problem."

## Bank of America reaps net profit

*continued from page 1*

loan applications it processes without a significant increase in costs.

"We don't make technology decisions; we make business decisions," said Dick Griffith, executive vice-president of the World Banking Group. "We don't care if it's the best. What we care about is customer service and profit."

At a recent meeting with *Network World,* Bank of America executives discussed the status of two projects that have been instrumental in helping the bank cut costs and improve customer service.

The projects, both of which are nearing completion, are a $5 million upgrade of the bank's international network, which is expected to save the company $30 million over five years, and a $100 million project to restructure its California branch office network.

**International reach**

Kicked off in 1989 and scheduled for completion in 1991, the effort to upgrade the international network involves replacing parallel voice and data networks with an integrated digital backbone.

The network already supports international voice communications and an international on-line data network, which the bank has been installing incrementally since 1983 to support commercial banking transactions.

The on-line network enables business customers to open accounts in any currency at any Bank of America office in the world and transfer money between accounts as necessary without handing off the transaction to a third party. This simplifies the banking needs of large

*(continued on page 46)*

## Guru lays out developments

*continued from page 16*

network computing would only accelerate in the future as desktop microprocessors get more powerful and memory gets less expensive.

"But not everything is going to be distributed," he said. "We recognize the need for peer-to-peer networking, and in the future, it may be that all workstations will be servers as well. But there will still be a need for servers that are specialized for managing certain resources."

Besides, Major said, peer-to-peer networking is "really more at the client side," which Novell regards as Microsoft's domain. "I don't know whether we will do a stronger offering or just leave it to Microsoft. In any case, though, we will support whatever Microsoft does."

Software companies that come to dominate a piece of the market have historically tended to become complacent, and NetWare users have expressed concern that Novell might sit back and milk the benefits of its market share.

Major said there is no danger of this at Novell, which spent $45 million on research and development in 1989 and expects that figure to hit $60 million in the current year.

"Ray [Noorda, Novell's chairman, chief executive officer and president] always talks about us being two years ahead and gaining, and we want to continue to do that," Major said. "The original vision we had in 1981 was correct, but we're still not done. There are new things we see now that we didn't see years ago and that we need to finish."

## McDATA enhances 6100E

*continued from page 23*

"The 6100E Telnet software eliminates the need for 3270 emulation in any host," said Brian Witt, product manager of interoperability products at McDATA.

The Telnet module lets a user at a terminal or engineering workstation attached to a Telnet terminal server establish a session with the 6100E and request data residing on the IBM host.

The 6100E reformats the request into 3270 data and passes it to the IBM host.

The FTP module supports file transfers from a Telnet terminal server to the 6100E, which also reformats the data into 3270 files and forwards it to users of IBM terminals (see graphic, page 23).

FTP allows an engineer on an Ethernet, for instance, to send a list of part numbers to a 3270 user for editing, Witt said. The device appears to an IBM host as an IBM PU Type 2 cluster controller.

**NetView link**

The 6100E can also now support a direct connection to IBM's NetView network management software, making it possible to pass generic alerts to the host-based software.

The TCP/IP support for the 6100E is available now and costs $5,000. Pricing for the terminal server starts at $26,250.

## HP to offer server version

*continued from page 23*

the request to that location.

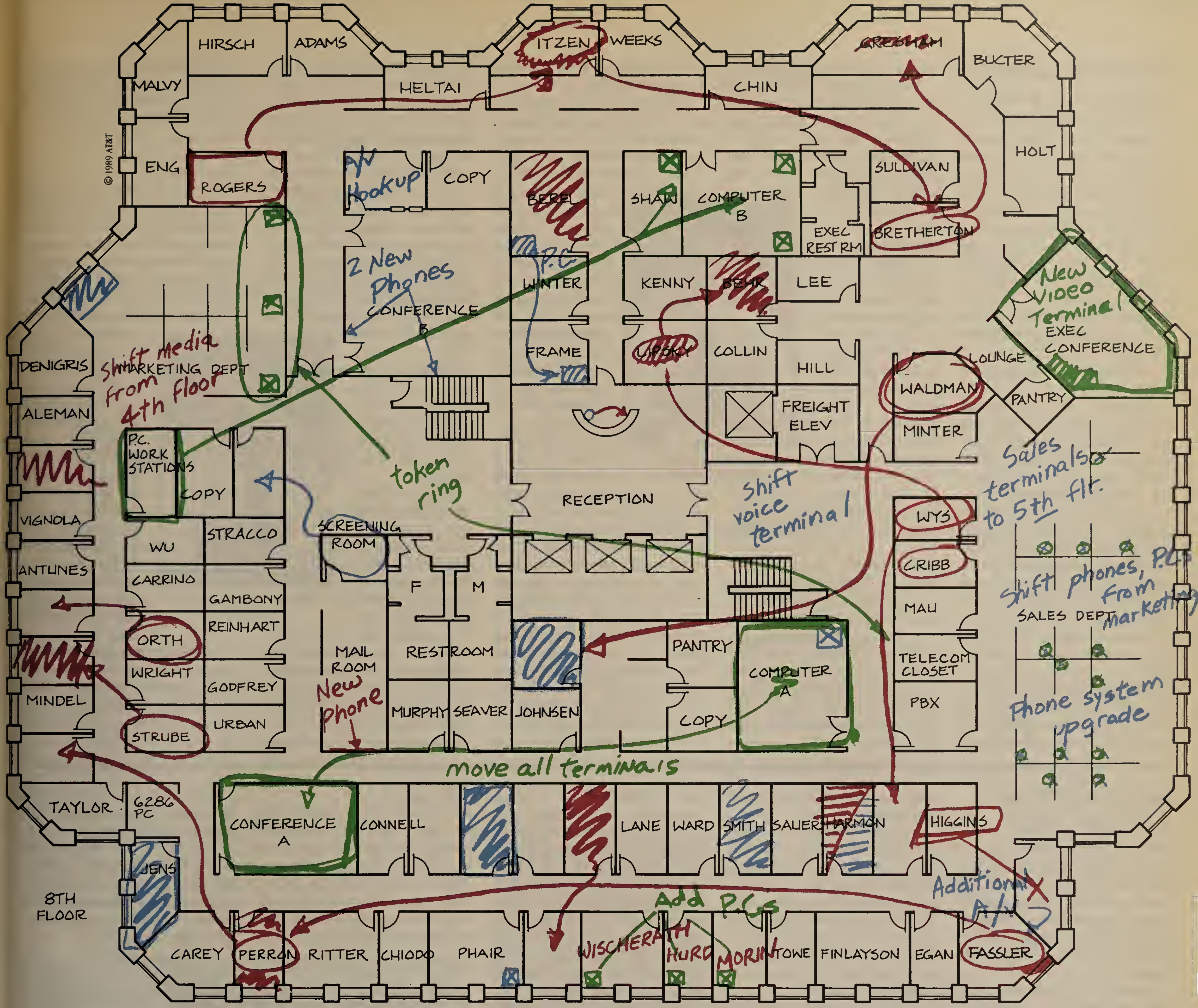
A user will simply be able to click on an icon of an object and NewWave will establish the necessary communications path to retrieve the object, regardless of where it resides on the net.

"A user would never know or care where the object was actually located," McDonnell said.

The concept is similar to the process used in Novell's global naming services, said Bill Crow, HP's manager of systems technology for NewWave. HP may even integrate its distributed object management offering with Novell's global naming services, he said.

In their efforts to further integrate NewWave and NetWare, Novell will recommend NewWave to its customers and HP will recommend NetWare as one of the many networks on which NewWave can run. HP already resells NetWare.

"Novell is the dominant supplier of LANs, and we recognize the need to work much more closely with Novell," McDonnell said.



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# Bank of America reaps net profit

*continued from page 44*

multinational companies, speeds up transaction handling and heightens security.

After rolling out the network in 1983, the bank accelerated its deployment in 1986 and is now scheduled to complete the project next year, at which point the on-line system will be available in 47 countries.

Griffith said the on-line network is a key strategic asset for the bank.

"No other bank can offer that today," he said.

Migrating the international voice and on-line data network to a digital backbone based on multiplexers from Newbridge Networks, Inc. required an initial investment of $5 million.

The bank expects the network will save it $6 million per year over the next five years by consolidating facilities and taking advantage of advanced voice compression techniques, according to Peter Hill, the senior vice-president heading the bank's telecommunications services unit.

The Newbridge equipment can support voice circuits at 16K and 8K bit/sec while providing sound quality similar to average international links, Griffith said.

Migration to the new backbone will involve the elimination of network hubs in Chicago and New York, and the addition of other hubs in Concord, Calif., Singapore, Tokyo and the London suburbs of Bromley and Croyden.

**Bank of America's Bruce Fadem**

### Branching out

The other major project that has helped the bank to rebound is its Customer Online Information Network (COIN), a network linking the bank's branches in California. COIN is expected to save the bank $250 million over the next five years while improving customer service and increasing sales.

The project, started in 1986 when the bank had reached its lowest point, stemmed from a desire to develop retail banking systems that could reuse code.

Instead of having device-specific hosts and networks supporting devices such as automatic teller machines and branch office teller terminals, the bank wanted to be able to support a range of end-user devices from the same host and applications.

COIN was initially deployed in newly established customer support centers, which were created by taking customer service personnel out of the bank's 850 individual branches and setting up 60 shared service centers. Consolidating customer service allows the units to be managed more efficiently and frees up branch office employees to concentrate on selling bank services, according to Bruce Fadem, the senior vice-president who heads the bank's retail automation services division.

Now when customers call their banks to stop payments on checks or conduct other business, their calls are routed to a regional service center where their inquiries are fielded by service representatives using IBM Personal System/2s to access the needed bank resource. If customers have questions that can only be answered by the local branch, the call is transferred to that branch.

After successfully field-testing the system in the service centers, Bank of America began moving it out to its branch offices, which are being equipped with token-ring networks and PS/2s. The network is now 65% completed and scheduled to be finished next year. The bank is installing the system at roughly 16 branches per week. About 300 workstations are installed weekly.

Today, COIN supports 600 local-area networks and 16,000 workstations. Each LAN supports a gateway to the bank's Concord data processing center, which controls the network. According to bank officials, there are another 300 free-standing LANs in the organization.

**Bank of America's Peter Hill**

When completed, COIN will support 20,000 Personal System/2 terminals. Half the terminals will be used by tellers, 8,000 will be used by account officers, and the remaining 2,000 will be used by the customer service staff. COIN is the largest on-line, interactive PS/2 network in the world, Griffith said.

According to Hill, the network can support as many as 40,000 concurrent tasks when the 16,000 terminals use windowing techniques to access multiple applications.

### The future

As a technical platform, COIN should last for the next 10 to 15 years and enable the bank to add new applications as necessary. Bank officials said the longevity of the system and the hundreds of millions of dollars it will save justify the massive automation expenditures.

Griffith said integrating the bank's technology department with the business community has been an important part of Bank of America's recent success. "Instead of that 'we-they' thing, like a wall's there, business and technology are working together," he said.

With more than 400 technology projects in the works, the bank is positioning itself to build on its billion-dollar rebound and become even more successful in the 1990s. ☒

# SQL coalition tackles issue

*continued from page 1*

totype scheduled for demonstration early next year. The specification, which defines a relatively simple SQL interface, will be offered for public scrutiny in the form of a white paper in a few weeks.

It is still a far cry from the "big data base in the sky," in which all corporate data stored on all platforms in an enterprise network becomes a single virtual data base. The effort will only address the relatively recent relational data bases, while huge amounts of data will still be held hostage in non-relational DBMSs running on aging legacy systems.

However, it does appear to be a move in the right direction. The question is: Is it a tiny step or a giant leap?

The vendors in the SQL Access Group say they are engineering a major breakthrough in relational DBMS interoperability. Those vendors include Ashton-Tate Corp., Digital Equipment Corp., Informix Software, Inc., Ingres Corp., Microsoft Corp., Oracle Corp., Sybase, Inc., Tandem Computers, Inc., Teradata Corp. and X/Open Co., Ltd.

Independent data base consultants and data base vendors outside the consortium expressed various degrees of skepticism, ranging all the way up to the suggestion that the members' activities are mere window dressing aimed at appeasing their increasingly interoperability-minded customers.

"It's just a facade," said Richard Finkelstein, president of data base consultancy Performance Computing, Inc. in Chicago. "I believe large corporations are demanding a common SQL access method, so the vendors have to show that they are working on one. [But] IBM's not part of the group, [so] forget it."

IBM's absence leaves a major hole in the SQL Access Group. In the relational DBMS world, as in so many other areas of computing, the world's largest computer company is the elephant around whose feet all the other vendors must dance. Any common SQL access method that does not support IBM's DB2 or SQL/DS will be of limited value.

SQL Access Group officials continue to try to recruit IBM and point to their success just last week in convincing another significant holdout, Sybase, to join the organization (see "Sybase joins SQL group," this page). They also point out that IBM does participate in the ANSI SQL committee, which is responsible for developing a standard version of SQL and which engages in considerable cross-pollination with the SQL Access Group.

The problem the vendors in both organizations face now is timing. By the time they sat down together and started working on standards, they had all developed their own mutually unintelligible dialects of SQL, adding vendor-specific extensions such as Sybase's much-vaunted "stored procedures" and "triggers."

The SQL Access Group is leaving the standardization of the actual language to the ANSI committee and focusing on developing a standard interface based on a common subset of SQL that all members can support, said Harjit Sabharual, chairman of the group's Formats and Protocols Technical Subcommittee.

This lowest common denominator approach is drawing criticism from some who say it will produce an interface that is too anemic to be useful.

"There are more extensions than there are standard portions to all these data base engines," Finkelstein said. "And people buy them or develop for them because of these unique features, not because of the standard components."

Addressing this issue, Sabharual said the application program interface in the first specification includes an "escape mechanism" that can be used to support vendor-specific features in the various data base engines. However, experts seem to think using it will require knowledge of the individual engines on the part of developers.

"Syntactically, the SQL Access Group may be able to provide for multivendor interoperability, but semantics are something else," said Colin White, president of data base consultancy Colin J. White Consulting, Inc. in Morgan Hill, Calif. "There are too many subtle differences among the various engines.

"It's sort of a toe in the water, but I don't think users should expect too much," White said. "If users believe that when the prototype is demonstrated early next year, they are going to have something usable, I think they are fooling themselves."

Perry Mizota, a marketing manager at Sybase, agreed. "The first interface will be limited. But it's a trade-off. Developers have to decide between one product that supports a lot of different data bases and one that exploits all the features of a particular engine." ☒

# Sybase joins SQL group

LONG BEACH, Calif. — The SQL Access Group, a consortium of vendors trying to define a standard method that client applications can use to access heterogeneous SQL data bases, got a boost last week when Sybase, Inc. joined its ranks.

Sybase and Microsoft Corp., which also joined the group last week, signed on as producer members. Only producer members can vote, and they must commit one high-level programmer to full-time work on the organization's technical specification. Microsoft co-developed the OS/2 version of the Sybase SQL Server.

The recruitment of Sybase leaves only IBM among the major vendors of SQL-based data bases that remain outside the SQL Access Group fold.

"We initially took a wait-and-see attitude because we weren't sure how effective a consortium like this could be," said Perry Mizota, a marketing manager at Sybase. "We were very pleased to see how quickly the group moved."

Founded last fall, the SQL Access Group has already completed its first technical specification, an embedded SQL interface. The members are working on building a prototype of the interface and have scheduled an interoperability demonstration for next year.

Mizota said Sybase was eager to help the group develop a call-level interface similar to the one Sybase provides with its own SQL Server data base engines. This type of interface provides developers with more functionality than the one in the initial SQL Access Group specification, which defines a standard for embedding SQL statements in client programs.

Sybase said it also wants to see the organization broaden its goals to include a method for accessing all the non-relational data bases users installed before the SQL era.

— *Susan Breidenbach*

# User needs drive outsourcing

*continued from page 1*

have involved major U.S. corporations with vast data processing facilities and worldwide networks. These companies have signed long-term contracts worth hundreds of millions of dollars, and plan to transfer hundreds of employees and substantial technology assets to vendor companies.

"What's really new about outsourcing," said Howard Anderson, managing director of The Yankee Group, "is that the biggest and smartest companies are doing it, not just firms with 10-year-old systems looking for 5-year-old solutions."

> "The real benefit of outsourcing is it provides a good excuse to evaluate your operations."
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Although there is still no hard-and-fast definition of the term, outsourcing at its purest level involves the transfer of IS assets or staff to a vendor that assumes profit and loss responsibility for some or all of the user's data processing and network operations. Rather than owning and operating the network, the user simply pays for service on an ongoing basis.

This definition does not include related practices, such as facilities management, systems integration and time-sharing (see "Glossary of outsourcing terms," this page).

Facilities management involves using vendor personnel to run data center or network facilities owned by the user.

In systems integration, a user hires a vendor to oversee a specific project that can last for as long as several years.

In contrast, users that enter outsourcing arrangements permanently relinquish daily oversight or responsibility for certain systems or network functions.

Time-sharing involves using a vendor's computers to run certain business applications, such as payroll.

### Driving forces

There are compelling forces driving companies to consider outsourcing today.

One of the most important is cost savings. In some cases, outsourcing vendors have promised to reduce annual IS outlays by 50%, although 15% to 30% savings are more common.

That's sweet music to many companies, particulary those wounded by leveraged buyouts or heightened competition in today's economy.

In 1988, American Standard, Inc., a worldwide manufacturer of plumbing, air conditioning and automotive products, outsourced its data center and network operations to two vendors, McDonnell Douglas Information Systems Co. and Genix. At the time, the company was facing a hostile takeover bid from Black & Decker Corp.

The deal will save American Standard $5 million over the life of the two five-year contracts, according to Gary Biddle, vice-president of information services and technology.

Biddle said the outsourcing move dovetailed nicely with the company's efforts to downsize corporate bureaucracy and focus on its core businesses.

### Shedding routing tasks

Network managers also see outsourcing as a way for them to shed routine tasks, such as moves, adds and changes, in order to focus on strategic projects that can provide their companies with a competitive advantage.

Chevron Corp., for example, just turned over its nationwide IBM Systems Network Architecture net to AT&T and its point-of-sale retail network to Hughes Network Systems, Inc.

The company, which has been hurt by the downturn in the oil industry, entered the deal to save money but also to free up its communications staff to concentrate on developing strategic applications.

"We wanted our pool of talented communications people to work more closely with [Chevron] companies to develop strategic applications. They can't do that if they also have to build and maintain the nets," said Tom Mulgrew, manager of network design at Chevron.

Other companies are prompted to consider outsourcing because of the difficulty in finding skilled network operators to fill critical positions.

"Outsourcing has enabled us to get rid of the headaches involved in putting together a technical staff," said Thomas Byrnes, vice-president and group manager of telecommunications at Merrill Lynch. "Skilled workers are difficult to find, hard to hire and expensive to train."

Last year, Merrill Lynch turned over its voice and private-line network to MCI Communications Corp. in a five-year, $150 million deal ( "Merrill Lynch to sign MCI as lead carrier," *NW,* June 12).

Byrnes added that the improved ability of vendors to provide reliable service has made it possible for a company like Merrill Lynch, whose network is critical to its bottom line, to consider outsourcing.

### Cost-efficient, reliable

"Vendors are starting to provide reliable, cost-efficient services in many areas they couldn't before," Byrnes said.

Some users are skeptical about outsourcing, claiming that the current interest in outsourcing is a product of media hype and bandwagoning by consultants and vendors.

But they acknowledge that outsourcing has caused them to take a hard look at the efficiency of their operations.

Last year, Avon Products, Inc., which was struggling financially, evaluated whether to outsource its data centers and network. In the end, the cosmetics maker decided to keep operations in-house because the potential cost savings from outsourcing did not outweigh the risks ("User rejects outsourcing," *NW,* Dec. 18, 1989).

The firm ended up consolidating six data centers, a move that is expected to save the company about $3 million in 1991, according to Raymond Perry, vice-president of IS at Avon.

"The real benefit of outsourcing is that it provides a good excuse to evaluate your operations and address areas that need improvement," Perry said.

## Glossary of terms

**Facilities management:** Hiring vendor personnel to operate and manage user-owned computing and network facilities.

Enables companies to capitalize on experienced vendor personnel to compensate for shortage of skilled workers or lack of in-house expertise.

**Outsourcing:** Transferring computer and network assets, as well as day-to-day systems operations and net personnel, to a vendor.

**Systems integration:** Hiring a vendor on limited-term basis to oversee the installation of an information systems project involving equipment from multiple vendors.

Allows companies to supplement the skills of in-house personnel with outside specialists.

**Time-sharing:** Running applications on a vendor's computers.

Enables users to automate operations without investing in equipment.

— *Wayne Eckerson*

# Changing mart threatens all

*continued from page 6*

future oligopoly environment."

Carriers have recognized the fact that they need a larger customer base to compete with the Big Three, according to Mark Flynn, a general partner at Volpe, Welty & Co., an investment banking firm in San Francisco.

"I encourage second- and third-tier carriers to make themselves attractive to be acquired or to become a merger partner," Flynn said.

While a merger or acquisition could be a carrier's best bet, users will likely suffer because of decreased competition in the long-distance industry, Flynn said. While prices have steadily dropped since 1984, they are likely to stabilize or rise as consolidation increases, he said.

Some carrier executives took exception to the gloomy prospect of devising an exit plan.

For example, Chadwick Paul Jr., president of Chadwick Telephone in Bethlehem, Pa., said his company will continue to fare well as long as it remains focused on its customer base and provides face-to-face customer support — which the larger, more bureaucratic carriers have difficulty accomplishing.

Second-tier carriers are also mobilizing to battle a new opponent — call aggregators. Aggregators are a new breed of resellers that offer deep discounts by combining the network traffic of multiple customers to qualify for maximum volume and multisite discounts offered by carriers.

"Because aggregators don't need to make any up-front investment, they have a tendency to make decisions based on making a quick buck," said Mike O'Leary, manager of net planning at American Sharecom, a Minneapolis-based long-haul reseller.

# Motorola to build global net

*continued from page 1*

Noecker, manager of field operations for Tenneco Gas in Houston. "We would have an immediate use for it along at least half of our pipeline," which travels from the Gulf Coast to both the Northeast and the Chicago area. He said existing cellular systems cover less than half of that area.

Motorola is forming a consortium of firms that will fund and operate Iridium, which is scheduled to be fully operational in 1996, Motorola's Knudsen said.

The consortium will also help Motorola in what is expected to be a formidable regulatory challenge over licensing for Iridium. In the U.S., Motorola has to file a detailed system proposal with the Federal Communications Commission, which it has not yet done, although Knudsen said Iridium will use frequencies between 1.5 and 1.6 GHz.

"There are a lot of other services currently operating in those frequencies," said an FCC source who requested anonymity. "There probably would be a problem. Depending on what frequencies they pick, there might need to be a reallocation" of existing frequency licenses. The source said other aeronautical, maritime and mobile satellite services use frequencies within the range proposed by Motorola.

A similar process would have to be completed in each country in which Iridium will be offered, as well as with organizations charged with frequency allocation on an international basis, according to the FCC source.

Lawrence Moore, manager of public affairs for Motorola's Government Electronics Group, said the company expects the partners in its consortium will already have licenses in many countries for frequencies within the 1.5- to 1.6-GHz spectrum.

So far, Knudsen said, those partners include three existing satellite communications suppliers: American Mobile Satellite Corp. in Washington, D.C., International Maritime Satellite Organization in London and Telesat Mobile, Inc. in Ottawa.

Those companies use satellites that are in a geostationary orbit more than 22,000 miles above the earth. Such satellites can serve only a limited portion of the earth's surface.

Iridium will be based on satellites operating 413 nautical miles above the earth in seven different polar orbits, with 11 satellites in each orbit. Each satellite will serve as many as 37 cells on earth, with each cell about 360 nautical miles in diameter. Satellites will be able to hand off calls to adjacent satellites in the same orbit, and gateways will be built to pass calls between satellites in different orbits, Knudsen said.

The number and orbit of the satellites ensures a continuous line of site to at least one satellite from any point within 100 miles of the earth's surface, he said.

Iridium will support 4.8K bit/sec digital voice, which he said is standard for satellite voice, and data at up to 2,400 bit/sec.

Motorola will publish the specification for how to access the system, which means any vendor could supply user terminals and radiotelephones. Only about three watts of power will be required in such devices, along with a 3-in. antenna.

Motorola plans to use a fast packet switching technique between satellites, although the switching equipment has yet to be determined, he said. Motorola will launch two satellites in 1992 and seven by 1994, all for testing the system. All 77 satellites are expected to be up in 1996.

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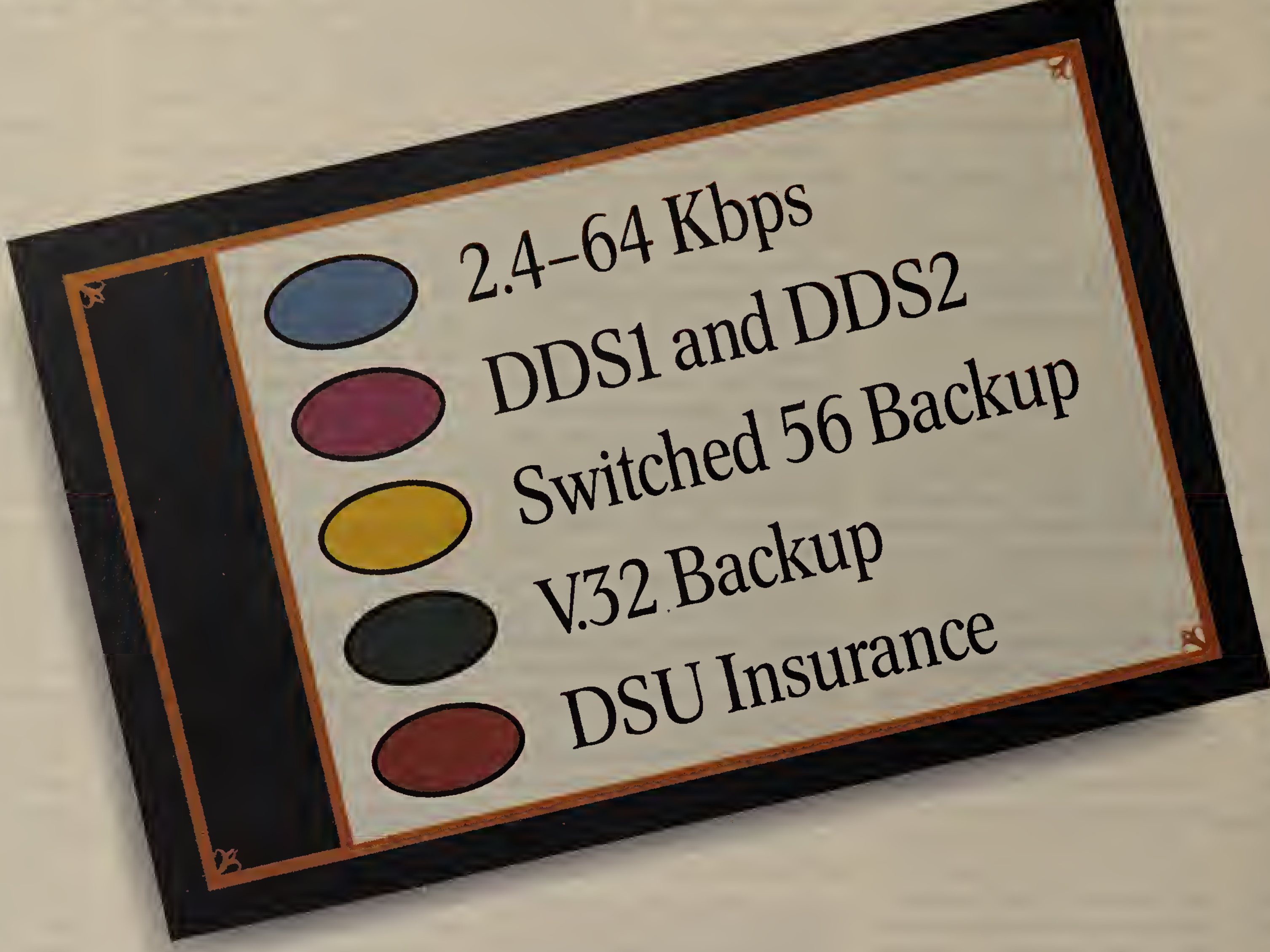

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